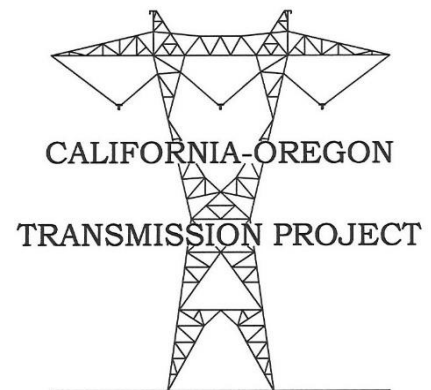


# TRANSMISSION AGENCY OF NORTHERN CALIFORNIA

## WILDFIRE MITIGATION PLAN

### FOR THE

## CALIFORNIA-OREGON TRANSMISSION PROJECT



JULY 2022

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## **I. Plan Overview and Objectives**

### **A. Policy Statement**

The Transmission Agency of Northern California (TANC or Agency) is a joint powers agency comprised of 15 publicly owned utilities (POUs) and irrigation districts (Members) located throughout northern and central California. TANC's mission is to assist its publicly owned utility Members in providing cost-effective energy supplies to their customers, through long-term ownership or contracts for service over its high-voltage transmission line within California and the western United States.

To support this mission, TANC constructed, maintains, and operates the California-Oregon Transmission Project (COTP or Project), a 340-mile 500 kilovolt (kV) transmission line and related facilities, that extends from the California-Oregon border to central California. The COTP is the newest component of the 500 kV California – Oregon Intertie (COI), a critically important electrical transfer path between California and the Pacific Northwest. As a component of the COI, the COTP plays a key role in fulfilling the energy and reliability needs of California and the Pacific Northwest. The COTP provides an additional 1,600 megawatts (MW) of power exchange capability between California and the Pacific Northwest. It also provides a third transmission path between the two regions, thus significantly reducing the chances and effects of major power outages across the electric grid. Because of its importance to the electric grid, the COTP has always been operated and maintained to ensure its full availability and reliability.

TANC contracts with the Western Area Power Administration (WAPA) to provide operations and maintenance services for the COTP. As the primary owner and Project Manager for the COTP, TANC manages the Project in a safe and reliable manner that minimizes the risk of catastrophic wildfire that its electrical lines, substations, communication sites, compensation station and related equipment may pose. Other COTP Participants include WAPA, the City of Redding, Pacific Gas and Electric Company (PG&E), San Juan Water District, and the Carmichael Water District.

### **B. Plan Purpose**

The purpose of this Wildfire Mitigation Plan (Plan) is to document the practices, procedures, processes and communications required, with the goal of minimizing the probability that TANC infrastructure might be the original or contributing source of a wildfire; and to comply with all applicable provisions of Senate Bill 901 (Statutes 2018; Ch. 626: SB 901) and Assembly Bill 1054 (Statutes 2019; Ch. 79: AB 1054) as they apply to TANC as a POU. It is subject to direct oversight by the TANC Commission and COTP Management Committee and is implemented by TANC, as the primary owner and Project Manager for the COTP. This Plan also complies with the requirements of Public Utilities Code section 8387 for publicly owned electric utilities to prepare a Wildfire Mitigation Plan by January 1, 2020, and annually thereafter followed by its submittal to the California Wildfire Safety Advisory Board (WSAB).

## C. Plan Objectives

TANC's objectives for minimizing the threat of catastrophic wildfire attributed to its facilities and complying with applicable laws and regulations include the following:

1. Minimizing Sources of Wildfire Ignitions from the Project;
2. Minimizing Wildfire Spread Rates;
3. Maintaining the Resiliency of the Bulk Transmission Grid;
4. Progressively Applying the Most Effective Wildfire Prevention and Mitigation Strategies; and
5. Annually Improving Overall Plan Effectiveness. Each of these objectives is described below.

### 1. Minimizing Sources of Wildfire Ignitions from the Project

Effective implementation of this Plan has the primary objective of minimizing the probability that the design, operations, maintenance, and related activities and best practices conducted in support of the safe and reliable operation and maintenance of the COTP may be the origin of or a contributing cause of the ignition of a wildfire.

### 2. Minimizing Wildfire Spread Rates

This objective seeks to proactively implement fire prevention and mitigation strategies and activities that minimize the spread of wildfires near the COTP that could become catastrophic if they spread rapidly and damage lives, property, and natural resources.

### 3. Maintaining the Resiliency of the Bulk Transmission Grid

This objective seeks to establish and maintain consensus and communications among bulk transmission grid operators regarding: 1) whether the COTP would be deenergized in response to an existing wildfire threat, and if so; 2) the communications and operational protocols that could be implemented to maintain grid resiliency.

### 4. Progressively Applying the Most Effective Wildfire Prevention and Mitigation Strategies

This objective is intended to progressively apply the most effective wildfire prevention and mitigation strategies. These strategies may include but are not limited to expanding effective on-the-ground maintenance, vegetation management and fuels inspections, potential risk and equipment failure detection technologies, aerial inspection methods and adding technology to improve situational awareness.

### 5. Annually Improving Overall Plan Effectiveness

This objective is intended to annually review this entire Plan to evaluate and improve its effectiveness in serving the compliance requirements and wildfire risk reduction needs and obligations of the TANC members and COTP Participants.

## D. Plan Organization and Compliance with Senate Bill 901

The implementation activities and compliance requirements are organized in the following sections:

- I. *Plan Overview and Objectives;*
- II. *Plan Context;*
- III. *Plan Implementation Roles and Responsibilities;*
- IV. *Wildfire Risks and Risk Drivers Associated with the COTP;*
- V. *Wildfire Prevention, Mitigation, and Response Strategies;*
- VI. *Wildfire-Related Communications Protocols Regarding COTP Deenergization, Recloser Disabling, and Service Restoration; and*
- VII. *Plan Evaluation and Metrics.*

This Plan was developed from in 2019 and updated in 2020, 2021, and 2022. It complies fully with applicable sections of SB 901. Table I-1 indicates applicable SB 901 requirements and the corresponding section of this Plan that addresses each requirement.

Table I-1 Senate Bill 901 Compliance Requirements and Corresponding Plan Sections and Pages	Plan Section & Page
PUC § 8387. (a) Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.	All
(b) (1) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, and annually thereafter, prepare a wildfire mitigation plan.	Entire Plan
(2) The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:	See Below
PUC § 8387 (b)(2) (A) An accounting of the <b>responsibilities of persons</b> responsible for executing the plan.	III, 9
PUC § 8387 (b)(2) (B) The <b>objectives</b> of the wildfire mitigation plan.	I, 2
PUC § 8387 (b)(2) (C) A description of the <b>preventative strategies and programs to be adopted by the local publicly owned electric utility</b> or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.	IV, 18
PUC § 8387 (b)(2) (D) A description of the <b>metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance</b> and the assumptions that underlie the use of those metrics.	VII, 40
PUC § 8387 (b)(2) (E) A discussion of how <b>the application of previously identified metrics</b> to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.	VII, 42
PUC § 8387 (b)(2) (F) <b>Protocols for disabling reclosers and deenergizing portions of the electrical distribution system</b> that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.	VI, 37
PUC § 8387 (b)(2) (G) Appropriate and feasible <b>procedures for notifying a customer</b> who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.	VI, 39
PUC § 8387 (b)(2) (H) Plans for vegetation management.	V, 34
PUC § 8387 (b)(2) (I) <b>Plans for inspections</b> of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.	V, 32
PUC § 8387 (b)(2) (J) A list that <b>identifies, describes, and prioritizes all wildfire risks, and</b>	IV, 18

<b>Table I-1 Senate Bill 901 Compliance Requirements and Corresponding Plan Sections and Pages</b>	<b>Plan Section &amp; Page</b>
<b>drivers for those risks, throughout the local publicly owned electric utility's or electrical cooperative's service territory.</b> The list shall include, but not be limited, to both of the following:	
(i) <b>Risks and risk drivers associated with design, construction, operation, and maintenance</b> of the local publicly owned electric utility's or electrical cooperative's equipment and facilities.	IV, 14
(ii) Particular <b>risks and risk drivers associated with topographic and climatological risk factors</b> throughout the different parts of the local publicly owned electric utility's or electrical cooperative's service territory.	IV, 15
<b>PUC § 8387 (b)(2) (K)</b> Identification of any <b>geographic area in the local publicly owned electric utility's or electrical cooperative's service territory</b> that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high fire threat district based on new information or changes to the environment.	II, 8
<b>PUC § 8387 (b)(2) (L)</b> A methodology for identifying and presenting <b>enterprise-wide</b> safety risk and wildfire-related risk.	IV, 18
<b>PUC § 8387 (b)(2) (M)</b> A statement of how the local publicly owned electric utility or electrical cooperative will <b>restore service after a wildfire</b> .	VI, 38
<b>PUC § 8387 (b)(2) (N)</b> A description of <b>the processes and procedures</b> the local publicly owned electric utility or electrical cooperative shall use <b>to do all of the following</b> :	See Below
(i) <b>Monitor and audit</b> the <b>implementation</b> of the wildfire mitigation plan.	VII, 41
(ii) <b>Identify any deficiencies</b> in the wildfire mitigation plan or its implementation and correct those deficiencies.	VII, 42
(iii) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.	VII, 42
(3) The local publicly owned electric utility or electrical cooperative shall present its wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies, and interested parties, and shall verify that the wildfire mitigation plan complies will all applicable rules, regulations, and standards, as appropriate.	VII, 43
<b>PUC § 8387 (c)</b> The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its wildfire mitigation plan. The independent evaluator shall issue a report that shall be made available on the Internet Web site of the local publicly owned electric utility or electrical cooperative and shall present the report at a public meeting of the local publicly owned electric utility or electrical cooperative's its governing board.	VII, 43

## II. Plan Context

### A. Introduction

California Senate Bill 901 requires that “Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.”

This section establishes the context of this Plan for complying with SB 901. The context focuses on the location and structural characteristics of the COTP physical assets. The Project assets include a single 500kV transmission line, three substations, one compensation station, and ten supporting microwave communication sites. This section also frames the regulatory context that has been established by the California Public Utilities Commission (CPUC) High Fire Threat Districts (HFTDs) and their importance for prioritizing Plan implementation activities associated with these physical assets.

## **B. COTP Physical Assets**

### **1. Project Transmission Line and Right of Way**

TANC's transmission assets represent its ownership in the COTP, which consists of a 340-mile, 500kV high-voltage transmission line extending from the California-Oregon border<sup>1</sup> to the Tracy Substation in central California. The COTP also includes a substation in Olinda, California, and a voltage compensation station near Maxwell, California. The COTP began operation in March 1993, represents a portion of the bulk electric system (BES<sup>2</sup>) in northern California, and provides 1,600 megawatts of scheduled transmission capacity between California and the Pacific Northwest. Plan implementation and development are framed by the physical extent of the Project and supporting resources as noted below:

- The COTP consists of only one 500kV right of way (ROW);
- There are no additional transmission facilities within the COTP ROW;
- The COTP includes no distribution facilities;
- All Project transmission and microwave towers are comprised of steel;
- All switching (i.e. reclosing) equipment is located within the COTP substations; and
- The substations and compensation station are surrounded by managed agricultural land uses with low-growing vegetation.

This Plan applies to all COTP facilities, including the transmission towers, conductors, right of way, substations, compensation station, communication sites, and all associated equipment. TANC does not own any transmission facilities below 500kV, or any distribution level facilities that serve retail customers. The COTP was designed and is maintained to always to be in full compliance with applicable California Public Utilities Commission (CPUC) General Order 95 Rules for Overhead Electric Line Construction.

### **2. Project Communication Sites**

There are ten remote microwave communication sites that support COTP operations (Figure II-1). These sites range in size from one to two acres, and include microwave and other communication systems, towers, equipment shelters, power systems, antenna and antenna support systems and cables and all necessary and proper foundations, footings, crossarms, guys, anchors, radio and

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<sup>1</sup> The COTP originates at the Captain Jack Substation in southern Oregon. The first six miles of the line – from the Captain Jack Substation to the California border – is managed by the Bonneville Power Administration.

<sup>2</sup> The definition of the bulk electric system (BES) can be found at: 2014. North American Electric Reliability Corporation. Bulk Electric System Definition Reference Document. Version 2, April 2014.



associated equipment, appliances and fixtures. The COTP communications sites' power supplies are delivered by local distribution level power service providers.

### **C. The California Public Utilities Code Fire Safety Regulations and High Fire Threat District**

The CPUC adopted the boundaries of a new High Fire Threat District (HFTD) in 2017.<sup>3</sup> The boundary of the HFTD is based on two maps, which are:

- The United States Forest Service ("USFS") and California Department of Forestry and Fire Protection's ("CAL FIRE") joint map of Tree Mortality High Hazard Zones ("Tree Mortality Map"<sup>4</sup>); and
- The "CPUC" Fire-Threat Map<sup>5</sup>.

The HFTD has three fire-threat areas; Zone 1, Tier 2 and Tier 3.

- Zone 1 consists of Tier 1 High Hazard Zones ("HHZs") on the Tree Mortality Map. Tier 1 HHZs are in direct proximity to communities, roads, and utility lines, and are a direct threat to public safety.
- Tier 2 consists of areas on the CPUC Fire-Threat Map where there is an elevated risk from wildfires associated with overhead utility facilities.
- Tier 3 consists of areas on the CPUC Fire-Threat Map where there is an extreme risk from wildfires associated with overhead utility facilities.

The CPUC also adopted significant new regulations to enhance the fire safety of overhead electric power lines and communications lines in the HFTD. Those new fire safety regulations modified existing California General Orders (GO) 95 (Rules for Overhead Electric Line Construction), GO 165 (Inspection Requirements for Electric Distribution and Transmission Facilities), and GO 166 (Standards for Operation, Reliability, and Safety During Emergencies and Disasters).

Figure II-2 illustrates the physical and regulatory contexts for this Plan by overlaying the COTP transmission ROW, substations, compensation station, and communication sites on the respective Zone 1, Tier 2, and Tier 3 HFTD area boundaries. It presents the COTP ROW and communication site locations and ROW percentages that are mapped for each of these areas. This is the context within which this Plan addresses applicable SB 901 requirements.

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<sup>3</sup> Decision17-01-009 at 39, 48, and Ordering Paragraph 1.mm.

<sup>4</sup> The Tree Mortality Map may be updated from time-to-time by the USFS and CAL FIRE. Any such updates will be incorporated into the HFTD Map in accordance with the procedures set forth in Decision 17-01-009 at Ordering Paragraph 9.

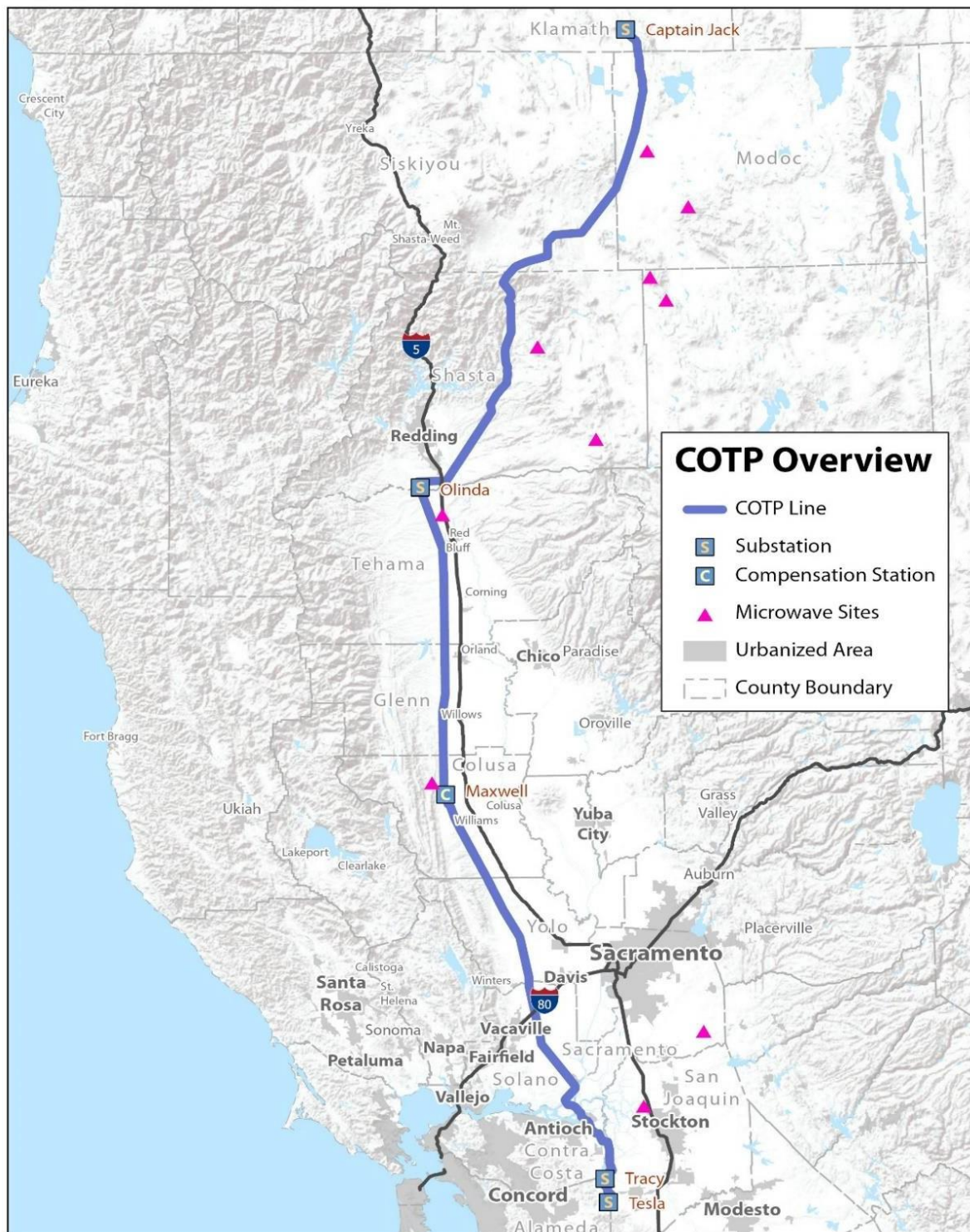


Figure II-1. COTP Overview

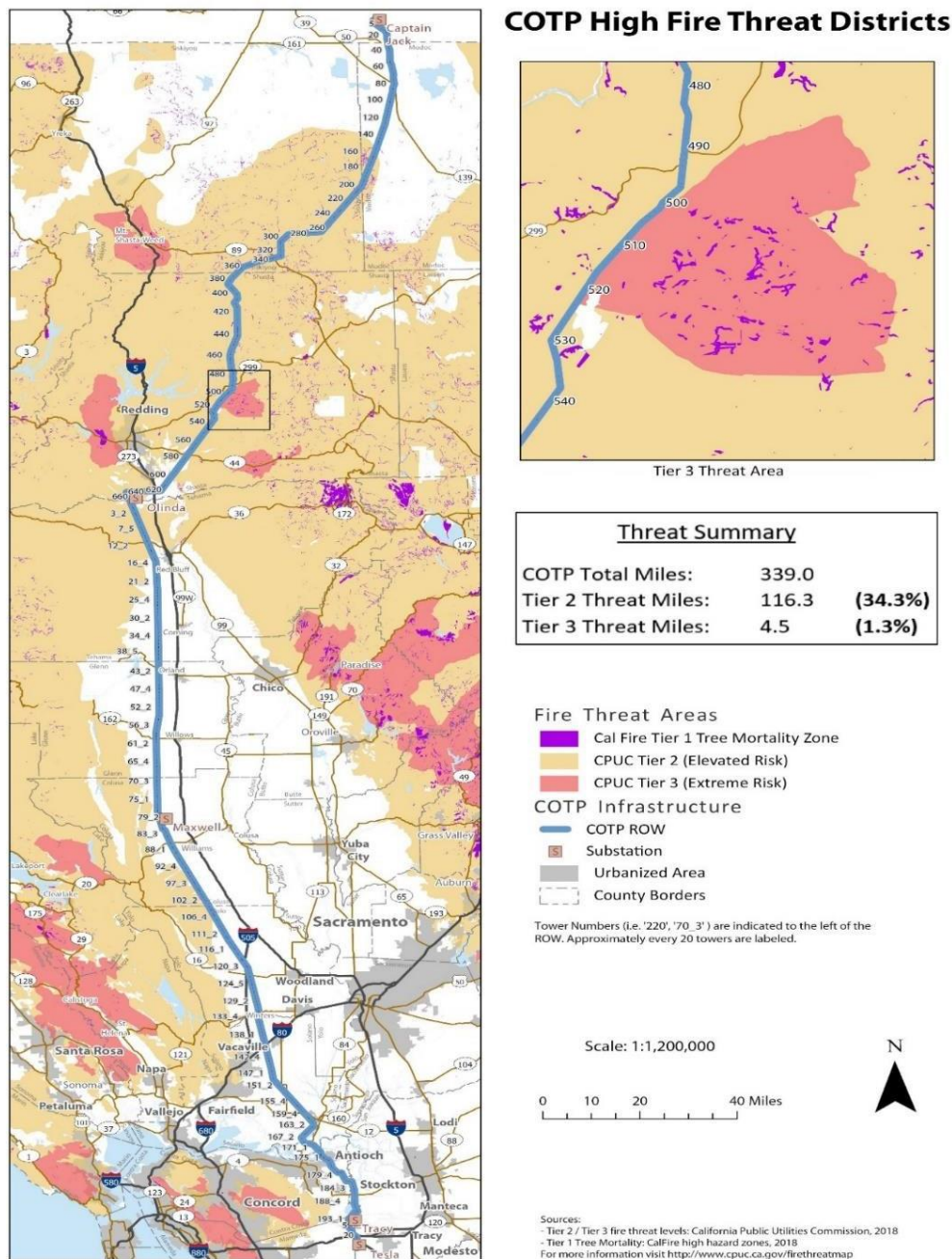


Figure II-2. COTP High Fire Threat Districts

## D. Changes to CPUC Fire Threat Map

California Public Utilities Code Section 8387(B)(2)(K) directs POU to identify any geographic areas in their respective service territories that are “a higher wildfire threat than is currently identified in the commission’s fire threat map, and where the CPUC should expand the HFTD based on new information or changes in the environment.”

TANC does not have an electric service territory or serve end-use electric customers. The geographic areas covered by the COTP are represented by a single ROW and related physical assets, including substations and communication facilities. TANC recognizes the importance of minimizing the potential for those COTP physical assets to ignite wildfires in those geographic areas where they are located.

Accordingly, TANC closely monitored the rulemakings that resulted in the development of the commission's fire threat map and HFTDs. That monitoring was followed by a detailed mapping of where the HFTDs intersect the COTP ROW. The mapping indicates that 4.5 miles of the COTP ROW intersects with Tier 3 areas, and 116.3 miles of the COTP ROW intersects with Tier 2 areas (Figure II-2). TANC is therefore prioritizing enhanced COTP inspections and maintenance activities as wildfire risk prevention, mitigation and response strategies in those Tier 3 and Tier 2 areas. TANC is also maintaining a high level of awareness of potential wildfire risks in all other geographic areas covered by the COTP ROW and assets through routine facility inspections and maintenance activities.

Based on the results of TANC's ongoing routine and enhanced COTP inspections and maintenance activities in all fire threat areas, TANC has not identified any geographic areas associated with the COTP ROW and assets that may be a higher wildfire threat than is currently identified in the commissions' fire threat map and agrees that the HFTD map has properly identified the level of wildfire risk in close proximity to the COTP.

### **III. Plan Implementation Roles and Responsibilities**

This section establishes the roles and responsibilities for implementing this Plan as noted below:

- TANC and COTP Governance, Organization, and Management Responsibilities;
- WAPA Organization and Implementation Responsibilities; and
- TANC Responsibilities for Compliance with All Applicable Laws, Orders, and Regulations

#### **A. TANC and COTP Governance, Organization, and Management Responsibilities**

TANC is a joint powers agency created consistent with California Government Code Section 6500 et. seq. It is governed by a commission consisting of representatives of each TANC Member. Members of TANC include the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara and Ukiah; the Modesto and Turlock Irrigation Districts; the Sacramento Municipal Utility District (SMUD); and the Plumas-Sierra Rural Electric Cooperative. Each Member appoints its Commissioner and Alternates. The Joint Powers Agreement signed by TANC Members in 1984 set specific guidelines for the organization and governance of the Agency.

Among other items, TANC must abide by the provisions of the California Government Code and specifically the Ralph M. Brown Act, which governs the meetings of local legislative bodies.

TANC is also required to prepare and adopt an annual budget adequate to meet its operation and maintenance costs as well as its debt service obligations.

The Commission has organized the Agency, as shown in Figure III-1 - TANC Organization Chart, to provide for the governance, management, and conduct of TANC's activities. All decisions are made by the Commission except for those specifically delegated to TANC Chair, TANC General Manager, TANC Assistant General Manager, TANC Committees, or other officers of the Agency. The decision to adopt this Plan will be made by the TANC Commission and the COTP Management Committee. TANC also designates a representative to the COTP Management Committee, the governing body for the Project. The COTP Management Committee provides managerial and policy direction, cooperation, the interchange of information, and decisions and consultation among those entities that constructed, own, operate, and have transmission entitlements on the Project (i.e. COTP Participants). TANC is the Project Manager, and is responsible for all the direction, conduct, coordination, management, and completion of all Project work. As the Project Manager, TANC chairs the COTP Management Committee. The Management Committee oversees and approves all Project work on behalf of the Project Participants and includes representatives from each of the six Project Participants:

- TANC
- WAPA
- San Juan Water District
- City of Redding
- Carmichael Water District
- PG&E

TANC is the primary owner and Project Manager for the COTP, and as a result, is responsible for providing for the overall management, operation and maintenance of the COTP, and approval of this Plan.

The TANC General Manager<sup>5</sup> will have the overall management responsibility for overseeing implementation of this Plan. TANC's General Manager directs and manages the professionals engaged by the Agency to carry out its activities in accordance with the direction provided by the TANC Commission and COTP Management Committee.

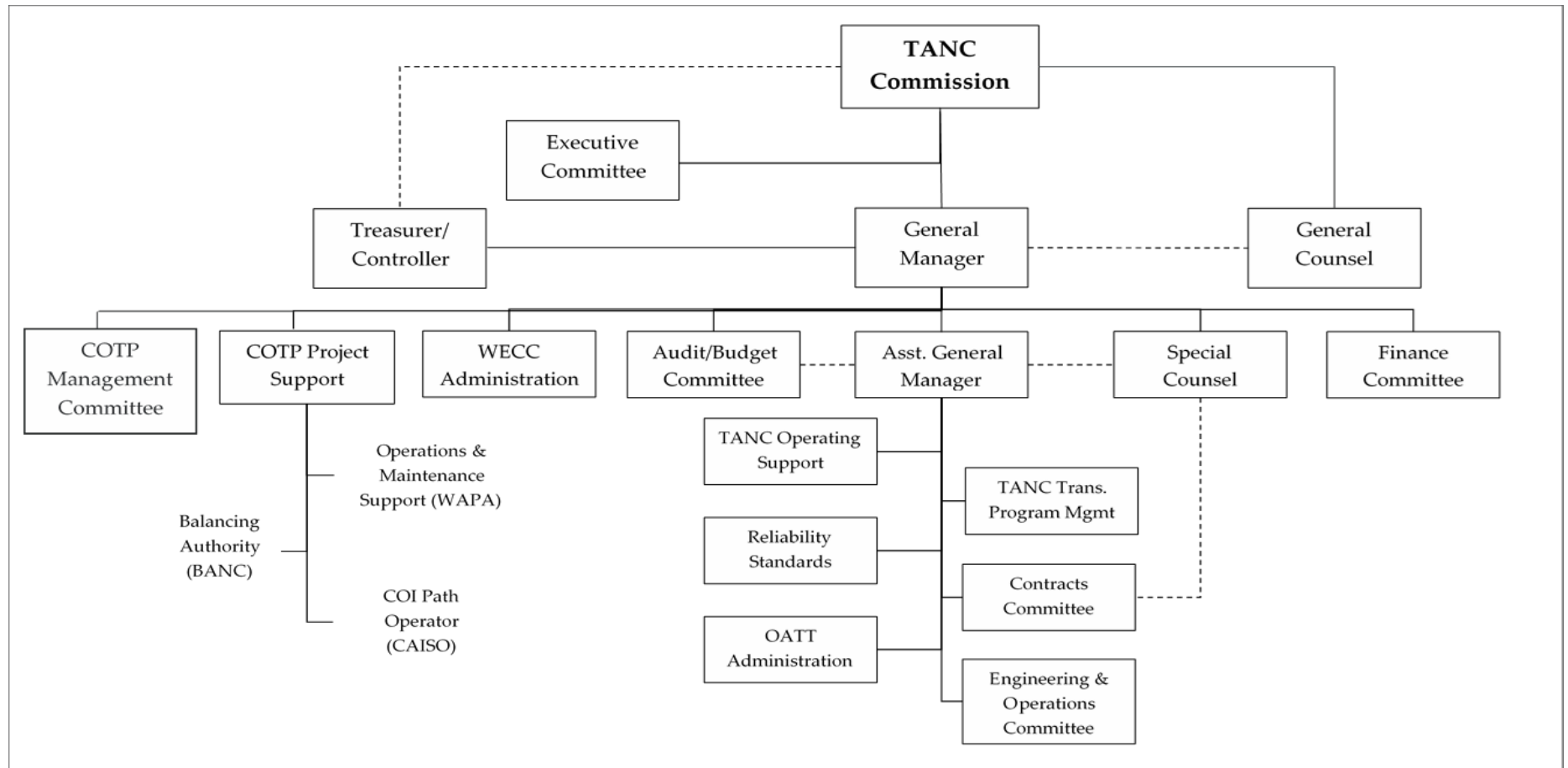
The TANC General Manager will be assisted by the TANC Assistant General Manager<sup>6</sup> in overseeing implementation of this Plan. The TANC Assistant General Manager will provide leadership and exercise authority in connection with the management of professionals engaged by the Agency to implement this Plan.

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<sup>5</sup> All references to the TANC General Manager in this Plan include an "Interim" General Manager. TANC Resolution 2020-15 vested the power and authority of the General Manager in the TANC Interim General Manager.

<sup>6</sup> The TANC Assistant General Manager position is currently vacant.





**Figure III-1-TANC Organization Chart**

BANC: Balancing Authority of Northern California; CAISO: California Independent System Operator; OATT: Open Access Transmission Tariff; WECC: Western Electricity Coordinating Council.

## B. WAPA Organization and Implementation Responsibilities

WAPA is one of four Federal Power Marketing Administrations within the United States Department of Energy whose role is to market and transmit wholesale electricity from multi-use water projects. WAPA also has extensive experience in the operation and maintenance of high-voltage transmission facilities in the Western United States.

The COTP is located and operated within WAPA's Sierra Nevada Region (SNR) and WAPA SNR serves under a contractual agreement with TANC as the operations and maintenance agent for the COTP. The SNR is one of five WAPA regional offices. TANC has full responsibility for compliance with and implementation of this Plan. Acting on behalf of TANC, WAPA supports the implementation of several wildfire-related preventative strategies implemented as part of this Plan under long-standing contractual arrangements with TANC. The contracts include the following:

- The Project Operation and Maintenance Agreement (POMA);
- The TANC-Western Operation and Maintenance Agreement (TWOMA); and
- The TANC-Western Agreement for the Provision of Services Related to the COTP (TANC/Western COTP Agreement).

TANC will also coordinate with federal, state, and local fire management personnel as necessary or appropriate to implement this Plan. This includes, but is not limited to:

- Immediately reporting fires, pursuant to existing TANC and WAPA procedures and the requirements of this Plan;
- Complying with relevant federal, state, and industry standard requirements, including the industry standards established by the CPUC as applicable;
- Collecting and maintaining wildfire data necessary for implementing this Plan; and
- Providing opportunities for regular training programs for relevant personnel associated with Plan implementation responsibilities.

Table III-1 summarizes the TANC and WAPA roles and responsibilities for implementing Plan wildfire prevention strategies, mitigation practices, and related activities.

Table III-1. TANC-COTP Plan Roles and Responsibilities	
Role	Wildfire Mitigation Responsibility
TANC Commission & COTP Management Committee	Responsibility for Plan Implementation TANC-COTP Plan Adoption & Governance
TANC General Manager	Plan Implementation Management
TANC Assistant General Manager	Plan Implementation Management
WAPA Sierra Nevada Region Senior Vice President & Regional Manager	WAPA Operating Agent and Maintenance Responsibilities

### C. TANC Responsibilities for Compliance with All Applicable Laws, Orders, and Regulations

Most of the preventative strategies and activities implemented as part of this Plan will be conducted under existing maintenance and vegetation management rights and obligations within and adjacent to the COTP ROW and at Project communication sites. However, in the event that one or more Plan activities could potentially affect environmental and/or natural resources, applicable federal and state laws, orders, and regulations (LORs) will be followed. These LORs may include, but not be limited to:

- National Environmental Policy Act (42 USC 4321 *et seq.*: ““NEPA”);
- National Historic Preservation Act (Public Law 89-665; 54 U.S.C. 300101 *et seq.*: “NHPA”);
- Federal Endangered Species Act (16 U.S.C. §1531 *et seq.* (1973): “FESA”);
- Clean Air Act (42 U.S.C. §7401 *et seq.* (1970));
- Clean Water Act (33 U.S.C. §1251 *et seq.* (1972));
- California Environmental Quality Act (Public Resources Code sections 21000 *et seq.*);
- California Air Resources Act (CA Health and Safety Code sections 39000 *et seq.*);
- Applicable Sections of the California Fish and Game Code;
- Porter-Cologne Water Quality Control Act (California Water Code sections 13300- 13999 and Title 23 of the California Administrative Code);
- and
- Applicable Sections of the California Public Resources and Public Utilities Codes.

TANC will also follow applicable industry standards. The CPUC has established minimum overhead line, design, maintenance and inspection standards through General Orders (GO) 95 (Rules for Overhead Electric Line Construction, GO 165 (Inspection Requirements for Electric Distribution and Transmission Facilities), and GO 166 (Standards for Operation, Reliability, and Safety During Emergencies and Disasters).

## IV. Wildfire Risk and Risk Drivers Associated with the COTP

### A. Introduction

This section summarizes the three-step process TANC used to assess, categorize, analyze, and prioritize COTP wildfire risks (Figure IV-1).

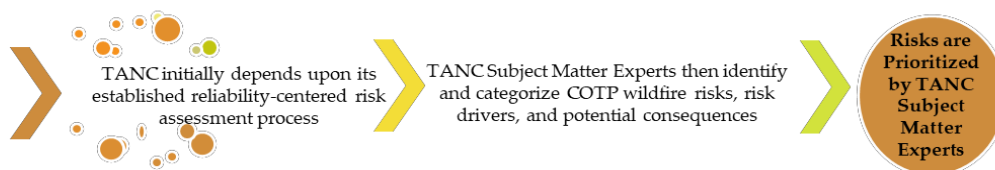


Figure IV-1. TANC Wildfire Risk Assessment Methodology.



Each of these three steps is described below.

## **B. Risk Assessment Methodology**

### **1. Step 1 – Reliance on Established Risk Assessment Approach**

TANC has an established reliability risk assessment approach. It is based on the reliability-centered maintenance (RCM) program provided by WAPA on behalf of TANC and the COTP. RCM is a systematic approach to evaluate equipment and resources. It results in a high degree of facility reliability and cost-effectiveness. RCM is highly dependent on monitoring predictive maintenance technologies, such as sensors that augment direct inspections and measurements that can detect the onset of potential equipment failures. The RCM system thereby allows causal stressors to be eliminated or controlled prior to any significant physical deterioration of COTP equipment.

Step 2 – Identification and Categorization of Potential Wildfire Risks and Consequences Based on their experience and expertise, TANC identifies and categorizes the wildfire risks, risk drivers, and potential consequences hypothetically associated with a COTP caused wildfire ignition event, as summarized below.

#### ***a. Wildfire Risks and Risk Drivers***

TANC has identified four categories of COTP-associated wildfire risks:

- Equipment, structure, and facility failures;
- Topographic and Climatological Factors;
- Object-to-equipment contacts; and
- Wire-to-Wire contacts.

Those failures capable of ultimately leading to heat, sparks, or flames — combined with flammable debris, litter, vegetation, wood waste, and other debris — could then result in a wildfire. Brief descriptions of each of these identified risks and their respective drivers are provided below.

#### ***i) Equipment, Structure, and Facility Failures***

- *Downed Conductor:* A downed conductor (or "wire down") occurs when a conductor drops or breaks from its designed attached or spliced location on or between towers and ends up on the ground, or free from its attachment point, sometimes in an energized mode. A wire down can result from a variety of factors. An energized conductor can ignite a fire or cause a shock hazard.
- *General Equipment Failure:* Electric equipment failure can be a source of a downed conductor or ignition. Failure of components such as tower failure, conductor splices, connector, hot line clamps, and insulators can

result in wire failure and end up in a wire down situation, sometimes in an energized mode that could ignite a fire.

- *Communication Site Ignition:* Wildfire ignitions associated with communication site equipment could result in a wildfire.
- *Weather-Related Equipment Failure:* Weather conditions may play a large part in the potential failure of COTP equipment. Excessive wind, lightning, and exposure to weather over time can degrade the integrity of the electrical components and lead to failure of one or more of the electrical parts causing an ignition.

The primary risks therefore associated with the design, construction, and operation of the Project towers, conductors, and all associated structural components, facilities, and equipment is the extent to which long-term metal fatigue and structural integrity degradation results from repeatedly applied loads. Metal fatigue is directly related to the number of stress cycles undergone by a part and the level of stress imposed on the part. Fatigue failures increase if parts have stress raising contours or if stress raisers such as notches, holes and keyways are put into the part. There is also a relationship between a metal's ultimate tensile strength and hardness and its ability to handle fatigue loads. The higher the tensile strength and hardness, the more likely it will fatigue if it is subject to high fluctuating loads.

*ii) Topographic and Climatological Risk Factors*

- *Topographic Factors:* The COTP crosses several miles of remote, variable, and often rugged topography and terrain. COTP towers are located at elevations ranging from sea level or slightly below near the Sacramento-San Joaquin Delta to over 6,000 feet in Shasta County. The terrain ranges from flat, cultivated agricultural lands to the Sierra Nevada foothills to steep mountain slopes and lava formations where vehicle access ranges from unsafe to inaccessible. Lee-side mountain slopes can be prone to strong downslope wind gusts under certain weather conditions. These gusts can cause increased risk of wires down and/or contacts between conductors in that area, leading to potential wildfire ignitions. Winds can also be funneled through canyons and mountain passes, resulting in similar effects.
- *Climatological Factors:* The highest fire danger occurs under weather conditions with very low humidity and strong winds. High temperatures, fuel loading, fuel type, and dead- and live-fuel moisture content are also important factors. Climatological risk drivers that may affect the climatic loading and associated stressors on the COTP may include:
  - Higher temperature fluctuations and wind speed impacts;

- Changing seasonal weather patterns associated with long-term climate change; and
  - Extended drought that may accelerate wear and tear on COTP facilities and equipment.
- *Climate Change Adaptation Risks:* Climate change is a multi-year, long-term risk factor with variable local effects that are not possible to reliably project for the COTP over shorter time frames. This Plan will be implemented to annually account for, document and address the effects of such weather-related factors through annual Plan inspections, monitoring and adjustments directed towards actively reducing wildfire risks on an ongoing basis as they are detected.

### iii) *Object-to-Equipment Contacts*

- *Vegetation Contact:* Vegetation such as falling or leaning trees, windblown branches, and trees growing in the ROW can contact powerlines under a variety of conditions. The contact can cause sparks or arcs. In some instances, the tree or branch may contact the powerline for a prolonged period and continue sparking or ignite due to resulting sparks.
- *Contact by Foreign Object:* Foreign objects coming into contact with COTP facilities can also introduce sources of ignition. For example, drones or light aircraft contacting the conductors may be highly conductive and could result in phase-to-phase faulting. In

The worst-case this can cause the conductor to fail and land in an energized mode, causing arcing and sparking in dry conditions.

- *Arcs Caused by Unauthorized Burn/Smoke:* Intentional brush and debris pile burning can lead to smoke that can form a low impedance conductive path between high voltage conductors. The resulting arc can in some cases spark fires on the ground below.
- *Insulator Contamination:* Contamination on insulators can create a path for electricity to flow. This unintended path can track and cause a fault. Typical causes are ash, dust, debris and bird excrement on the insulator. High voltage insulator cleaning paired with monthly inspections is necessary to ensure service is not unintentionally interrupted through a flashover. A proactive contamination prevention and maintenance program removes any material that settles on the surface and retains its insulating properties.

- *Vandalism.* COTP equipment may also be vandalized and damaged, which may cause sparks and fires.

*iv) Wire-to-Wire Contacts*

When two or more energized conductors get within close proximity of one another, they could cause sparks and possible material to be ejected. There are many factors that could lead to such an occurrence. Any type of shaking of the pole or high winds may cause powerlines to sway and touch. Certain types of faults (short circuits) down the line can cause powerlines to gallop (i.e. bounce and buck) that potentially leads to conductors getting within close proximity of one another.

***b. Wildfire Risk Event***

The risk event being addressed in this Plan is the risk associated with the ignition of a wildfire caused by or directly associated with the operations and maintenance of COTP facilities, assets, equipment, and/or personnel.

***c. Wildfire Consequences***

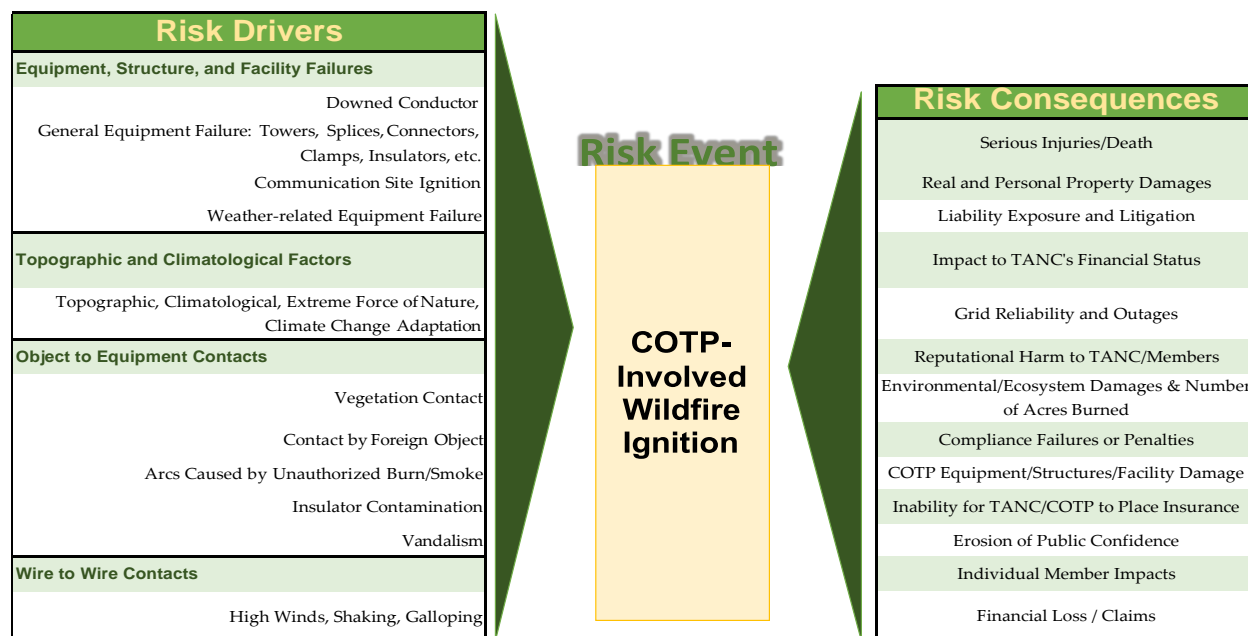
The impacts of a wildfire event can result in substantial loss and financial instability for the COTP Project Participants, TANC, and its Members. Worst-case scenarios present several consequences that are also particularly meaningful to COTP participants and operators. Those severe impacts include:

- Injury / death of field crews and/or the public;
- Damage and loss of real and personal property/structures;
- Litigation, resulting in financial impacts to COTP Project Participants, TANC, and its Members;
- Impact to TANC's financial status and creditworthiness;
- Long-duration outages and grid reliability issues;
- Damage to TANC's reputation/erosion of public confidence;
- Environmental, ecosystem, and natural resources damages; acres burned;
- Compliance failures and/or penalties;
- COTP equipment damage; and
- Inability for TANC and the COTP to acquire adequate insurance.

***d. Wildfire Risks, Risk Drivers, and Potential Consequences Bowtie Framework***

TANC has framed COTP wildfire risks, risk drivers/root causes, risk event, and potential consequences in a bowtie diagram (Figure IV-2). The bowtie diagram supports the analysis and prioritization of TANC's wildfire risks by providing a visual representation that allows TANC to consider a range of potential consequences associated with one or more types of risk.

Figure IV-2. TANC Bowtie Wildfire Risk Assessment Summary Diagram



## 2. Step 3 - TANC and COTP Enterprise-Wide Wildfire Risk Prioritization

Wildfire risk prioritization is an enterprise-wide process for TANC because of the magnitude of the potential consequences. As described in Section III, TANC has several organizational controls in place to manage risks and their consequences. The TANC Commission, General Manager, Assistant General Manager, and TANC and COTP committees meet several times annually to manage Agency risks that can be summarized into five general categories that include:

- Financial Risks;
- Legal Risks;
- Regulatory Risks;
- Security and Safety Risks; and
- Reputational Risks.



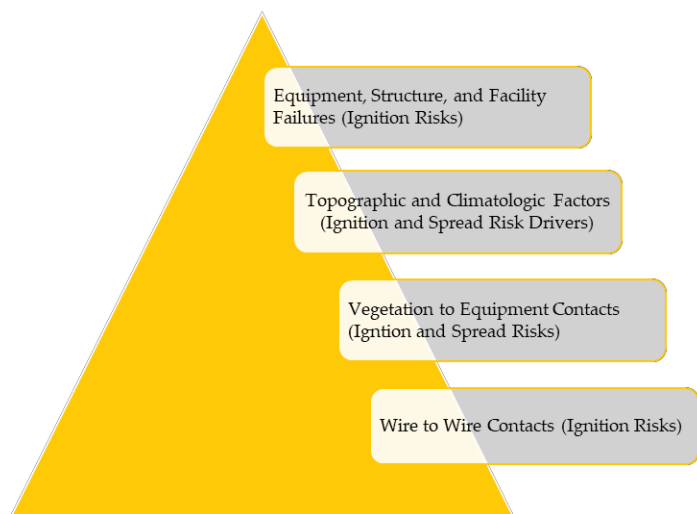
Figure IV-3. TANC Enterprise Risk Categories

The TANC wildfire risks and consequences summarized in the bowtie framework (Figure IV-2) also fall into one or more of these enterprise risk categories (Figure IV-3). TANC has initially prioritized these risks consistent with the intent of SB 901, CA Pub. Res. Code § 8387(a), which states that:

*“Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.”*

TANC recognizes that: 1) a fire ignition becomes a wildfire when it spreads beyond immediate containment; and 2) it becomes catastrophic when it spreads to result in consequences that damage lives, property, and other resources. Based on this recognition, TANC has initially prioritized COTP-associated wildfire risks based on those most likely to ignite a fire, and those most likely to cause it to spread to become a potentially catastrophic wildfire. Consistent with these precepts, and routine reviews of COTP reliability risk assessment data, TANC has prioritized potential wildfire risks as presented in Figure IV-4:

These wildfire risks form the basis for the development and implementation of TANC wildfire prevention, mitigation and response strategies presented in Section V.



**Figure IV-4. Prioritized List of TANC-COTP Wildfire Risks**

## **V. Wildfire Prevention, Mitigation, and Response Strategies**

### **A. Introduction**

This section presents the wildfire prevention, mitigation, and response strategies (Wildfire Strategies) to be implemented as part of this Plan. Two sets of mutually complementary TANC wildfire strategies are described below. The first set of strategies are referred to as “Enhanced” strategies. Enhanced strategies are those inspections, maintenance, vegetation and access roads management, and situational awareness activities that are being scheduled more frequently and augmented with technology to address potential wildfire ignition risks that may be associated with the HFTD areas. Those enhanced wildfire strategies are then complemented by the second set of established TANC wildfire prevention, mitigation, and response strategies, which are discussed below. Enhanced wildfire strategies are summarized in Tables V-1 and V-2. Brief descriptions of TANC’s established wildfire strategies follow those tables. The combined implementation of the established and enhanced wildfire strategies is the foundation upon which this Plan will be implemented.

## B. Enhanced Wildfire Prevention, Mitigation, and Response Strategies

TANC's enhanced wildfire strategies will be implemented with respect to time, location, and risk priorities, as noted below:

- *Time Prioritization:* Strategies will be implemented either before the end of June or at any other time each year. For activities scheduled for implementation before June, TANC will consider the forecasted critical fire weather conditions on a county-specific basis. The COTP crosses 12 counties, including (from north to south) Modoc, Siskiyou, Shasta, Tehama, Glenn, Colusa, Yolo, Solano, Sacramento, Contra Costa, San Joaquin, and Alameda. Time prioritization scheduling will always consider the associated fire risks.
- *Location Prioritization:* Wildfire risk reduction strategies scheduled in HFTD Tier 3 areas are of the first, or highest priority, and strategies scheduled in HFTD Tier 2 areas are of the second highest priority. Wildfire risk reduction strategies scheduled in all other areas are of the third highest priority. An additional location-related priority is the consideration of whether the strategy can be implemented within and/or outside of the COTP ROW, depending on the level of control TANC has in exercising existing ROW easement rights.
- *Level of Risk Priority:* Strategies will be implemented consistent with the following risk priorities:
  1. Equipment, structure, and facility failure risks;
  2. Topographic and climatological factors;
  3. Vegetation to equipment contact risks; and
  4. Wire to wire contact risks.

Strategies scheduled for implementation, consideration, and evaluation for wildfire risk reduction are presented in two separate tables:

- Strategies to be implemented by June or before the end of each year (Table V-1); and
- Strategies to be evaluated and considered through 2022 (Table V2).

The tables include brief descriptions of enhanced strategies and supporting activities.

Tables V-1 and V-2 track the annual approaches and progress achieved for all of the Wildfire Prevention, Mitigation, and Response Strategies. For each year, the progress achieved becomes the basis for the subsequent years' approach. This is consistent with the monitoring and auditing of plan implementation discussed in greater detail in section VII, below.

Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented Annually					
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
One Additional Maintenance Patrolman	Increased Personnel by Adding One Dedicated Maintenance Patrolman	All	ROW	Any	Structure and/or Equipment Failure
<p><b>Strategy Description:</b> WAPA added one additional maintenance patrolman in 2019. The patrolman is dedicated to conduct transmission line ROW inspections and is responsible for observing and accurately reporting ROW conditions on all patrols to include but not be limited to danger trees, brush, and fire hazards and any other unsafe or damaged equipment.</p> <p><b>2020 Progress:</b> In 2020, the patrolman completed transmission line ROW inspections on all COTP Tier 2 and Tier 3 HFTDs, participated in infrared (IR) and ultraviolet (Corona) light camera inspections, and began assisting in the development of a Unmanned Aerial Vehicle (UAV) Program at WAPA to conduct ROW inspections more efficiently.</p> <p><b>2021 Approach:</b> In 2021, although there were no anticipated increases in dedicated personnel to implement the Plan, WAPA planned on adding three certified UAV pilots within the line maintenance program. The current patrolman will continue to assist in the development of a UAV program intended to improve ROW inspections efficiencies.</p> <p><b>2021 Progress:</b> In 2021, WAPA recruited three additional candidates for UAV training and made progress towards each of them earning their UAV licenses.</p> <p><b>2022 Approach:</b> In 2022, WAPA will continue to pursue adding UAV pilots to the UAV Program by expanding the candidate pool to all Maintenance Craft personnel. WAPA remains committed to expanding their UAV Program in 2022.</p>					
Expanded Inspection Capacity	Development of Long-Term Infrared, LiDAR, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Service Contract	2,3	ROW	Any	Structure and/or Equipment Failure
<p><b>Strategy Description:</b> Multi-year infrared and corona inspection contracts are on schedule to be developed by December 31, 2022. These contracts will ensure a reliable base of resources capable of augmenting existing inspection capabilities. Specialized IR and ultraviolet/Corona cameras are either hand-held or mounted to helicopters and the COTP ROW is flown. Special imagery attention is paid to splices, conductor connection and attachment points and insulators. The IR scan detects temperature differences and heat signatures of components, which may indicate problems (not visible to the naked eye) that could result in component or conductor failure. The Corona scan detects the degree of electric discharge or 'leakage' due to the ionization of air surrounding high voltage electric components, which, if substantial enough, could result in an arc flash or mechanical component failure. In addition, a high-definition camera takes pictures of anomalies found for review. A corrective action plan is developed for anomalies and integrated with any identified repair or replacement needs.</p> <p><b>2020 Progress:</b> The imagery contract was initially awarded to an aviation vendor for the 2020 inspections. It was subsequently withdrawn after the vendor was unable to meet agreed-upon deadlines. Ultimately all 2020 inspections were completed internally by WAPA linemen.</p> <p><b>2021 Approach:</b> In 2021, an imagery contract was to be awarded and IR and Corona inspections performed by June 30th, 2021.</p> <p><b>2021 Progress:</b> In 2021, a one-year imagery contract was awarded to an IR and Corona inspection vendor for the 2021 inspections. It was not awarded as a multi-year contract because of the shortage of available vendors. All 2021 IR and corona inspections were completed before the end of June meeting the WMP time requirement.</p>					




Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented Annually					
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
<p><b>2022 Approach:</b> In 2022, the contract solicitation will be made available earlier in the year to allow more vendors to provide quotes. The multi-year contract will collect information on HFTD Tier 3 and 2 equipment annually and non-HFTD once every 5 years or more frequently based on annual evaluations of inspection results. Inspections will focus on abnormal heat signatures and electrical discharges from equipment, particularly, splices, conductor connection and attachment points and insulators.</p>					
Structural & Equipment Inspections	Acquisition of Aerial Mounted Infrared, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Equipment	2,3	ROW	June 2021	Structure and/or Equipment Failure
<p><b>Strategy Description:</b> Acquisition of Aerial Mounted Infrared, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Equipment.</p> <p><b>2020 Progress:</b> WAPA acquired aerial-mounted infrared and corona cameras to conduct line inspections. WAPA also inspected all COTP Tier 2 and Tier 3 ROW segments. Those acquisitions and inspections were completed by May 31, 2020.</p> <p><b>2021 Approach:</b> In 2021, no new IR and Corona equipment acquisitions were scheduled. WAPA was developing market research and budget authorization for Aerial Mounted Infrared, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Equipment in the next 2-5 yrs.</p> <p><b>2021 Progress:</b> In 2021, WAPA conducted market research on the availability of inspection equipment and the level of effort needed to service and maintain the equipment once acquired. Primary research focused on corona equipment. There are few corona equipment distributors and service centers within the U.S. The current corona cameras must be sent to Israel for service. WAPA also discovered that all IR and corona inspection vendors were only providing the aircraft and subcontracting to one specific vendor which then provided the equipment and personnel to use. In 2021, WAPA used this vendor on-board WAPA aircraft and reduced contract costs by almost 60%.</p> <p><b>2022 Approach:</b> In 2022, WAPA will conduct further market research on other equipment, such as IR, LiDAR, and photo-imagery to assess if it is more cost efficient to acquire or contract out.</p>					
Structural & Equipment Inspections	Detailed Aerial, Climbing and/or Ground-based Tower and Equipment Inspections	2,3	ROW	June 2021	Structure and/or Equipment Failure
<p><b>Strategy Description:</b> Conduct detailed aerial, climbing, and/or ground-based tower and equipment inspections.</p> <p><b>2020 Progress:</b> Specific inspection plans were developed for HFTD Tier 2 and Tier 3 areas. All COTP HFTD Tier 2 and Tier 3 segment inspections were completed by June 30, 2020. Inspection plans were prioritized and implemented in response to Tier 2 and Tier 3 inspection information collected and evaluated on an ongoing basis.</p> <p><b>2021 Approach:</b> In 2021, the same job plan was to be performed by June 30. Based on those evaluations, WAPA Maintenance crews considered performing additional detailed ground inspections of COTP transmission towers. Tower inspections may involve climbing and inspecting every tower for structural and equipment issues as part of these enhanced inspections. A close visual inspection of the tower is conducted. Linemen look for any loose steel, bolts on the ground or any other aberrant condition. If they note that something requires correction, they either correct it at that time or schedule it for repair.</p>					

Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented Annually					
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
<p><b>2021 Progress:</b> COTP HFTD Tier 2 and Tier 3 ROW segment inspections were completed by June 30, 2021. There were four significant findings (three broken spacers and one hazard tree) identified and repaired.</p> <p><b>2022 Approach:</b> In 2022, the same job plan will be performed by June 30. If inspections reveal that structural and/or equipment repair issues are warranted, maintenance crews will either correct them at the time at which they are detected, or schedule them for timely repair.</p>					
Access Road Maintenance	Brush and Grade Six Miles of COTP Access Roads	3	Both	June 2021	Topographic/Climatological; Emergency and Wildfire Response Constraints
<p><b>Strategy Description:</b> Brush and grade six miles of COTP access roads.</p> <p><b>2020 Progress:</b> WAPA linemen graded approximately six miles of COTP access roads by May 31, 2020. Contract crews removed brush and trees throughout the COTP ROW to improve access for maintenance vehicles and crews, heavy equipment, and fire response vehicles.</p> <p><b>2021 Approach:</b> In 2021, WAPA targeted approximately five miles of access road grading in the Tier 2 HFTD with a completion deadline of December 31, 2021.</p> <p><b>2021 Progress:</b> Procurement delays resulted in the postponement of road improvements in the project area. The transmission line and towers remained fully accessible to crews in the project area.</p> <p><b>2022 Approach:</b> In 2022, WAPA will target approximately five miles of access road grading in the Tier 2 HFTD with a completion deadline of December 31, 2022. The procurement process for this effort has been prioritized and initiated earlier this year.</p>					
Vegetation Inspections & Management	Hazard Tree Mitigation Based on Most Recent LiDAR Analysis	All	Both	Any	Vegetation to Conductor Contact
<p><b>Strategy Description:</b> When implemented, this activity will rely on additional LiDAR data to identify potential hazard tree issues within and adjacent to the COTP ROW that have been identified aerially. This is especially valuable in challenging terrain where vehicular access for on-the-ground inspections may be limited. Information obtained from this analysis is usually followed by direct field inspection visits by utility arborists to directly assess the situation in the field.</p> <p><b>2020 Progress:</b> All LiDAR, oblique photography, orthophotography and high-definition video was collected as of May 25, 2020. The data was calibrated and integrated onto WAPA's GIS database after some minor delays related to the pandemic. WAPA used all conventionally available data to prioritize ground inspections and mitigation strategy implementation. That data included frequent, additional fire season on-the-ground inspections by utility arborists, existing aerial photography, and supporting inspection reports and data.</p> <p><b>2021 Approach:</b> In 2021, WAPA continued to use the LiDAR and conventional aerial, ground and supporting inspection-related data to plan and prioritize risk reduction work.</p> <p><b>2021 Progress:</b> LiDAR analysis identified 134 sites within the COTP ROW containing brush that represented potential minimum vegetation clearance distance encroachments that required follow-up during ground inspections. Three sites were expedited and removed in 2021.</p> <p><b>2022 Approach:</b> In 2022, WAPA will continue to use the LiDAR and conventional aerial, ground and supporting inspection-related data to plan and prioritize risk reduction work. Of the 134 sites initially identified with potentially encroaching brush, three were expedited and removed in 2021. Another 22 such sites are currently on work specifications to be removed by mid-year. The remainder of the sites will be prioritized for removal by the end of 2022 and early 2023.</p>					

Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented Annually					
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Vegetation Inspections & Management	Brush and Fuels Control	3	ROW	June 2021	Vegetation to Conductor Contact (Downed Conductor)
<p><b>Strategy Description:</b> Conduct brush and fuels control activities in the COTP ROW.</p> <p><b>2020 Progress:</b> Contract crews removed brush and trees throughout the COTP ROW to minimize fire spread/propagation by May 31, 2020. This activity included mastication, mowing, and manually removing brush and other flammable vegetation within the COTP ROW to create firebreak like conditions intended to eliminate or minimize the potential for fire spread/propagation.</p> <p><b>2021 Approach:</b> In 2021, WAPA continued to prioritize brush and tree removals throughout the COTP ROW to minimize the potential for fire spread/propagation. Prioritization for such removals is ongoing at all times throughout the year.</p> <p><b>2021 Progress:</b> Contract crews removed brush and trees on approximately 60 acres within COTP ROW to minimize the potential for fire spread/propagation.</p> <p><b>2022 Approach:</b> In 2022, WAPA will continue to prioritize brush and tree removals throughout the COTP ROW to minimize the potential for fire spread/propagation in HFTD Tier 2 and 3 areas. WAPA plans to target 80 to 100 acres in 2022 for fuel reduction work.</p> <p><b>HFTD:</b> High Fire Threat District Tier areas 2, 3 or All (1-3)  <b>ROW:</b> Right of Way or Off-Right of Way or Both  <b>2020 Schedule: June 1:</b> Completed by June 1 or <b>Any:</b> Any time in 2020  <b>2021 and 2022 Approaches:</b> Schedules are limited to before the end of June, or by the end of that calendar year.</p>					

Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022				
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Inspection	Research and Development of Drone Use for Structural, Equipment, and Right of Way Inspections	All	Both	Structure and/or Equipment Failure Vegetation to Conductor Contact Contact by Foreign Object
<p><b>Strategy Description:</b> WAPA is currently evaluating the feasibility of using UAV inspections in the SNR. These inspections could be implemented for the COTP. This activity focuses on research into the use of drones for inspections of all COTP, facilities, assets, equipment, and the ROW as they offer several potential inspection capacity improvements. UAVs are capable of close-order aerial inspections of transmission towers and conductors, communication sites, and existing and potential ROW encroachments. Drones can also provide more precise, repeatable data based on geographic positioning system (GPS) coordinates. The use of UAVs may also provide the opportunity to improve the accuracy and frequency of inspections and resulting records, and reduce potential safety hazards conventionally associated with transmission line climbing inspections.</p> <p><b>2020 Progress:</b> In 2020, these evaluations included the following discussions and milestones:</p> <ul style="list-style-type: none"> <li>WAPA evaluated the potential benefits of participating in energy research groups such as the Centre for Energy Advancement through Technological Innovation (CEATI) or the Electric Power Research Institute (EPRI) whose members contribute to research projects related to utility/energy technologies, including the use of drones.</li> </ul>				

**Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022**

Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
<ul style="list-style-type: none"> <li>WAPA reached out to other internal regions to inquire how they are using UAVs in their maintenance programs.</li> <li>WAPA worked with an aviation vendor on a UAV pilot project to capture aerial imagery on four miles of transmission line. The project successfully captured the imagery (see photo insets), which is being evaluated for its abilities to augment and support ongoing inspections programs.</li> <li>WAPA has begun to establish a UAV program and is identifying potential uses.</li> <li>WAPA-Sierra Nevada Region acquired a UAV in 2020 (Skydio 2).</li> </ul> <div data-bbox="565 632 1036 919">  </div> <p><b>2021 Approach:</b> WAPA is using lessons learned from other regions, electric utilities, and pilot projects to move the UAV program forward. WAPA anticipated increasing the use of UAVs in 2021 as opportunities arose.</p> <p><b>2021 Progress:</b> WAPA successfully utilized UAVs to inspect equipment, ground conditions and tree health. Some of the benefits were:</p> <ul style="list-style-type: none"> <li>Safety – Patrolman can inspect equipment safely from the ground;</li> <li>Efficiency – UAVs can be quickly and safely deployed for inspections;</li> <li>Accuracy – Clear, close-up images of equipment and potential issues are provided; and</li> <li>Surveying – UAVs facilitate enhanced observations of ground and immediately surrounding areas for potential vegetation and other fuels accumulations issues.</li> </ul> <p><b>2022 Approach:</b> WAPA will move forward with expanding the UAV Program to include additional drones and train candidates as UAV pilots become licensed.</p>				
<b>Vegetation Inspections &amp; Management</b>	<b>LiDAR Surveys of the COTP ROW and Adjacent Lateral Areas</b>	<b>All</b>	<b>Both</b>	<b>Vegetation to Conductor Contact</b>
<p><b>Strategy Description:</b> This activity focuses specifically on Light Detection and Ranging (LiDAR) surveys that would cover the entire COTP ROW and an additional 300-foot-wide lateral buffer. The use of the buffer zone will support enhanced analyses of:</p> <ul style="list-style-type: none"> <li>Grow-in and fall-in hazard tree assessments;</li> <li>Maximum tree height calculations; and</li> <li>Vegetation classification for fuels assessments.</li> <li>Lessons will be learned regarding: <ul style="list-style-type: none"> <li>The appropriate technical specifications and performance work standards for contractors;</li> <li>The quality of the information received for hazard tree assessments and growth rates; and</li> </ul> </li> </ul>				

**Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022**

Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
<ul style="list-style-type: none"> <li>The appropriate buffer width lateral to the existing COTP ROW to account for fuels assessments that can reduce wildfire ignition and propagation risks.</li> </ul> <p><b>2020 Progress:</b> The WAPA contractor completed collecting LiDAR information by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control throughout the summer of 2020. In the fall of 2020, WAPA received updated LiDAR data from the existing contract for those services. WAPA began comparing that data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial photography from commercial sources.</p> <p><b>2021 Approach:</b> In 2021, WAPA continued to compare LiDAR data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial photography from commercial sources. Those comparisons will help identify additional hazard trees that may not be identifiable from ground-based patrols due to terrain, ground access, or other limiting factors. Based on the comparison of LiDAR data from the 2020 contract and existing aerial photography and inspection reports, TANC and WAPA will evaluate from two to three years' frequency for contracting for LiDAR inspections.</p> <p>In 2021, WAPA Utility Arborists were also using the LiDAR deliverables to ground truth any potential vegetation encroachment issues. The data to date has proven to be accurate and useful in prioritizing and planning vegetation management and fuel reduction work. The plan is to continue testing the data and determining where the use of LiDAR can be expanded to areas outside the ROW. Moving forward, WAPA has started using the LiDAR data to determine vegetation density in and around the ROW, which can potentially be correlated with fuel loads. If successful, the data would be useful in planning and completing fuel reduction work.</p> <p><b>2021 Progress:</b> LiDAR inspections have been very useful in identifying potential in-ROW issues but less so for off-ROW hazards. The LiDAR data called-out all trees that were tall enough such that if they were to fall, they could fall into the line and contact and/or arc with the COTP conductors. Those results that directly correlated tree heights with fall-in potential resulted in hundreds of trees being misleadingly listed as potential fall-ins. Currently, we only address potential off-ROW fall-in trees as hazards if those trees are dead, in poor health (diseased or dying), leaning into the line, or compromised structurally (defective).</p> <p>All the data was incorporated into the WAPA GIS database and is accessible to WAPA linemen and utility arborists to ground truth any potential hazards. LiDAR was not very effective for identifying excessive fuel loading in and adjacent to the ROW, particularly understory fuels.</p> <p><b>2022 Approach:</b> WAPA will continue to focus on identifying in-ROW and off-ROW issues using all available data. WAPA will shift to using photo-imagery to preliminarily identify areas of heavy vegetation and excessive fuel for planning and completing fuel reduction work.</p>				
<b>Vegetation Inspections &amp; Management</b>	<b>Oblique Photography and High Definition Video</b>	<b>All</b>	<b>Both</b>	<b>Vegetation to Conductor Contact Situational Awareness Risk of Spread</b>
<p><b>Strategy Description:</b> This activity includes aerial photography and streaming video of the 200-foot wide COTP ROW and a 50-foot wide lateral, adjacent buffer zone on either side of the ROW edges for a total width of 300-feet of photographic coverage. This wide-path photography will allow assessments of fuels and debris piles accumulations within and adjacent to the COTP ROW.</p> <p>Based on the comparison of this imagery from the 2020 contract and existing aerial photography and inspection reports, TANC and WAPA will evaluate whether to pursue an interval of from two to three years' frequency for contracting for oblique photography and high-definition video imagery in the future. Lessons will be learned regarding:</p> <ul style="list-style-type: none"> <li>The appropriate frequency, technical specifications, and performance work standards for contractors;</li> </ul>				

**Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022**

Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
	<ul style="list-style-type: none"><li>• The quality of the information received for hazard tree assessments and growth rates; and</li><li>• The appropriate buffer width lateral to the existing COTP ROW to account for fuels assessments that can reduce wildfire ignition and propagation risks.</li></ul> <p><b>2020 Progress:</b> The WAPA contractor completed collecting oblique photography and high-definition video imagery by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control in the summer and early fall of 2020. In the fall of 2020, TANC and WAPA received current oblique photography and high-definition video from the existing contract for those services, and began comparing that data to existing inspection data.</p> <p><b>2021 Approach:</b> In 2021, WAPA continued to compare photography and video data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial photography from commercial sources. Those comparisons will help identify additional hazard trees that may not be identifiable from ground-based patrols due to terrain, ground access, or other limiting factors. In 2021, WAPA Vegetation Management staff and Utility Arborists are using the photography and video to identify vegetation management needs in the more difficult to access areas. This imagery is being used in conjunction with the LiDAR to provide a better overview of ground conditions and vegetation management needs.</p> <p><b>2021 Progress:</b> WAPA used all available photo-imagery data to supplement aerial and ground inspection data to help identify additional hazard trees that may not be easily identifiable due to terrain, ground access, or other limiting factors. This information was especially useful in approximately 10 miles along the Captain Jack – Olinda transmission line segment.</p> <p><b>2022 Approach:</b> WAPA will continue to use all available photo-imagery data to supplement aerial and ground inspection data to help identify additional hazard trees that may not be easily identifiable due to terrain, ground access, or other limiting factors.</p>			
Vegetation Inspections & Management	Orthophotography	All	Both	Situational Awareness Risk of Spread
<p><b>Strategy Description:</b> This imagery includes a one-mile-wide path of ortho-rectified photography extending along the COTP ROW. This higher-elevation, broader coverage of the ROW will allow wider fuels assessments and provide indications of potential property improvements, debris piles, and other wildfire risk reduction considerations adjacent to the ROW.</p> <p>Based on the comparison of this wide-perspective imagery from the 2020 contract and existing aerial photography and inspection reports, TANC and WAPA will evaluate whether to pursue from two to three years’ frequency for contracting for this one-mile-wide oblique photography. Lessons will be learned regarding:</p> <ul style="list-style-type: none"><li>• The appropriate frequency, technical specifications, and performance work standards for contractors;</li><li>• The quality of the information received for assessing wide-ranging wildfire risks and liabilities; and</li><li>• The appropriate buffer width lateral to the existing COTP ROW to account for fuels assessments that can reduce wildfire ignition and propagation risks to potentially vulnerable properties and resources.</li></ul> <p><b>2020 Progress:</b> The WAPA contractor completed collecting oblique photography and high-definition video imagery by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control in the summer and early fall of 2020. In the fall of 2020, TANC and WAPA received current oblique photography and high-definition video from the existing contract for those services.</p>				

**Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022**

Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
<p><b>2021 Approach:</b> In 2021, WAPA continued to compare orthophotography data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial imagery and photography from commercial sources. Those comparisons will help identify additional hazard trees that may not be identifiable from ground-based patrols due to terrain, ground access, or other limiting factors. In 2021, WAPA Vegetation Management staff and Utility Arborists are using the orthophotography to identify vegetation management needs for broader areas outside of the ROW.</p> <p><b>2021 Progress:</b> In 2021, WAPA used orthophotography data to identify vegetation management needs for broader areas outside of the ROW that are not normally captured during aerial and ground inspections. This data will aid the planning and prioritizing of future off-ROW fuel reduction projects.</p> <p><b>2022 Approach:</b> In 2022, the priority will be in-ROW fuel reduction through tower base clearing and ROW mastication, and off-ROW hazard tree mitigation. Off-ROW fuel reduction efforts will be developed as opportunities arise through partnership with other agencies and/or land managers.</p>				
<b>Vegetation Inspections &amp; Management</b>	<b>Expanded Collaboration with Other Public and Private Agencies</b>	<b>All</b>	<b>Both</b>	<b>Vegetation to Conductor Contact Situational Awareness &amp; Risk of Spread</b>
<p><b>Strategy Description:</b> This strategy focuses on leveraging existing and new relationships with the U.S. Forest Service, the California Department of Forestry and Fire Protection, other transmission owners and operators, and local entities where mutually beneficial wildfire risk prevention, mitigation, and response strategies can be expanded and/or developed in areas where the COTP could be at risk. These are ongoing programs where completion is evaluated by annual progress in advancing on-the-ground risk reduction activities.</p> <p><b>2020 Progress:</b> In 2020, TANC actively explored the expansion of its current relationships with the USFS to increase the extent of joint fuels management, access road maintenance, and related activities that reduce wildfire risks. These activities included:</p> <ul style="list-style-type: none"> <li>Advancing TANC's program of identifying and removing hazard trees located outside of the COTP ROW that pose fall-in hazards to the transmission line conductors and/or towers. TANC contracted for 58 miles of surveys of dead, decaying, dying, or diseased trees located outside the COTP ROW on U.S. Forest Service managed lands. TANC's Registered Professional Forester (RPF) identified approximately 290 hazard trees on the Modoc and Shasta-Trinity National Forests (Forests) by August. TANC then coordinated with staff representing each of these Forests throughout the remainder of the year with information that included estimated timber values, and potential removal effects on cultural, biological, and other natural resources. TANC received a formal notice to proceed with the removal of the 40 identified hazard trees on the Modoc National Forest in November. TANC paid approximately \$6,000 for the merchantable value of those trees in December.</li> <li>Staff initiated discussions for the development of a new collection agreement with the Shasta-Trinity National Forest (STNF). The new agreement may focus on increasing the acreage of fuels treatment and access road improvement activities on STNF managed lands.</li> </ul> <p><b>2021 Approach:</b></p> <ul style="list-style-type: none"> <li>COTP staff continued to collaborate with the STNF to achieve the approvals needed to remove approximately 250 off-ROW hazard trees identified in 2020. Staff provided information that helped STNF technical specialists review the potential impacts to cultural and natural resources so that appropriate resource protection measures could become conditions of such approvals. Support also included providing information to assist in the administration of a timber sale for those trees with merchantable</li> </ul>				

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Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
	<p>value to the STNF. TANC collaborated fully with the Modoc and Shasta-Trinity National Forests for the procurement of contract services for the removal of off-ROW hazard trees.</p> <ul style="list-style-type: none"> <li>TANC began the establishment of a relationship with the California Department of Forestry and Fire Protection (CAL FIRE) to better understand and therefore begin accessing the benefits of state forest management programs for projects consistent with procedures established in the CAL FIRE Vegetation Treatment Program (VTP) and similar state-sponsored programs.</li> <li>Staff continued to explore opportunities for other California-Oregon Intertie (COI) transmission owners to support additional fuels treatment projects in those areas where they may be mutually beneficial.</li> <li>COTP staff will accelerate the development of contract fuels reduction agreements with local entities that may include Fire Safe Councils, and towns and cities located near the COTP ROW.</li> </ul> <p><b>2021 Progress:</b></p> <ul style="list-style-type: none"> <li>TANC and the COTP received the required approvals from the STNF to remove hazard trees previously identified adjacent to the COTP ROW. Those approvals included the flexibility to continue identifying additional trees in 2021 and 2022 that have become hazard trees since the original 2020 surveys were completed. TANC also entered into a contract for the removal of all identified off-ROW hazard trees.</li> <li>COTP staff continued to work with WAPA to identify those non-federal responsibility areas where the use of the CAL FIRE VTP — potentially in combination with local fuels agreements — could result in the greatest level of wildfire risk reduction.</li> </ul> <p><b>2022 Approach:</b></p> <p>We anticipate removing all off-ROW hazard trees in the STNF by mid-2022 as ground conditions allow. The work will be substantially completed by contractors. COTP and WAPA staff will continue to coordinate the use of contract arborists and registered professional foresters to maintain an ongoing program of identifying and removing hazard trees on an ongoing basis.</p> <p>TANC will renew our collaborative fire response, fuels treatment, and access road maintenance and improvement collection agreement with the Modoc and Shasta-Trinity National Forests (USFS) (13<sup>th</sup> Collection Agreement). The agreement provides five years of funding to support TANC's share of costs to operate and maintain the Long Bell Fire Station and several mastication, prescribed burn, and manual vegetation management projects implemented by the USFS in areas that lie adjacent to the COTP and the other COI transmission lines. The agreement also funds access road maintenance and improvement work that improves responsiveness to wildfires near the COTP.</p> <p>The 13<sup>th</sup> Collection Agreement provides fire response and other wildfire risk reduction benefits to the other COI transmission owners. TANC will therefore continue to urge their additional participation in reducing wildfire risks in these national forests by collaborating with planned TANC and/or USFS wildfire risk reduction activities and projects.</p> <p>TANC will advance our efforts for developing local fuels agreements that would benefit from leveraging the environmental process efficiencies provided by the CAL FIRE VTP EIR. These efforts include but are not limited to considerations and ultimately the logistics pertaining to the identification of willing landowners, the appropriate management structure for such agreements, and related COTP and TANC asset and liability protections.</p>			



**Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022**

Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Recordkeeping	Upgrade Ground and Aerial Line Inspection Software for More Refined Data and Analyses	All	Both	All
<p><b>Strategy Description:</b> This activity will be used to evaluate the potential application of enhanced wildfire detection, inspection, situational awareness, and related tools that can improve the effectiveness of TANC's wildfire risk reduction strategies, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Installation of meteorological stations for localized, real-time temperature, wind speed, and related weather data generation and/or sharing;</li> <li>• Expanded use of infrared cameras for early identification of potential structural, equipment and related failures;</li> <li>• A splice assessment program designed to assess the integrity of transmission conductor splices. The technology uses an x-ray machine that encompasses a splice and takes an x-ray image of the splice;</li> <li>• Hyperspectral imagery obtained from rotary and fixed wing aircraft that measures vegetation clearance distances from the conductor as flown;</li> <li>• Wildfire simulation modelling that assesses the consequences of wildfires that may escape from the COTP ROW and affect populations, property, natural resources, and other potential exposures; and</li> <li>• Installation of high-definition pan-tilt zoom cameras to provide real-time information regarding locations within or near the COTP ROW where wildfire ignition and propagation detections.</li> </ul> <p><b>2020 Progress:</b> In 2020, TANC and WAPA initiated the review of new and/or improved technologies that can reduce COTP wildfire risks. These included the following discussions and milestones:</p> <ul style="list-style-type: none"> <li>• Evaluated the potential benefits of participating in energy research groups such as the Centre for Energy Advancement through Technological Innovation (CEATI) or the Electric Power Research Institute (EPRI) whose members contribute to research projects related to utility/energy technologies.</li> <li>• Researching the use of radio frequency harmonics and ultrasonic dish for early identification of potential structural and equipment issues.</li> <li>• Researching the use of satellite-based wildfire risk mitigation risk technologies, and coordinating demonstrations to review new wildfire mitigation risk mapping services.</li> </ul> <p><b>2021 Approach:</b> In 2021, WAPA continued to research ways to supplement or improve on the current available mapping resources with the use of new technologies or wildfire risk mitigation services. WAPA looks to participate in demonstrations and initiate pilot projects that use these new tools on WAPA-maintained infrastructure and ROWs.</p> <p><b>2021 Progress:</b> WAPA did not participate in any energy research groups, deciding that the funding to participate in such groups would be better applied to our current O&amp;M efforts. Evaluation of new technologies such as satellite-based wildfire risk mitigation technologies, frequency harmonics and ultrasonic dish did not appear to significantly enhance our current abilities to detect potential issues that would justify the cost.</p> <p><b>2022 Approach:</b> In 2022, WAPA will continue to research ways to supplement or improve on the current available mapping resources with the use of new technologies or wildfire risk mitigation services. WAPA will continue to explore opportunities to participate in demonstrations and initiate pilot projects that use these new tools on WAPA-maintained infrastructure and ROWs.</p>				

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Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Recordkeeping	Upgrade Ground and Aerial Line Inspection Software for More Refined Data and Analyses	All	Both	All
<p><b>Strategy Description:</b> This strategy focuses on upgrading and refining line inspection software to accommodate data and information collected through enhanced inspections. Software will be refined to more accurately categorize enhanced inspections and document their findings at the appropriate levels of detail. Additional upgrades may include but not be limited to capabilities that incorporate aerial imagery and the associated data collected through aerial inspections.</p> <p><b>2020 Progress:</b> In 2020, WAPA began upgrading line inspection software and the associated internal controls and situational awareness tools that are needed to accommodate more robust analysis and evaluations of enhanced inspections data. These upgrades included the following discussions and objectives:</p> <ul style="list-style-type: none"> <li>• The upgraded line inspection system was upgraded to integrate more seamlessly with WAPA's computerized asset management system.</li> <li>• The software is now available for utility arborists to use in the field for more efficient recording, documenting, and sharing of information between vegetation management staff.</li> </ul> <p><b>2021 Approach:</b> In 2021, WAPA-wide coordination will continue on the procurement and implementation of new software.</p> <p><b>2021 Progress:</b> WAPA implementation is ongoing and being tested in the field by the linemen.</p> <p><b>2022 Approach:</b> WAPA will continue to test new software in the field.</p>				
Continuous Training	Review Fire Safety Guidelines and Precautions	All	Both	All
<p><b>Strategy Description:</b> Enhanced inspections, the use of new inspection equipment, and a more intensive and frequent schedule for their implementation have emphasized the need for continuous fire safety training. This strategy focuses on continuous reviews of fire safety guidelines and precautions. Its purpose is to support evaluations of whether elevated high fire threat conditions require revisions of those guidelines and precautions.</p> <p><b>2020 Progress:</b> In addition to existing fire safety training, WAPA added the following training for those responsible for implementing wildfire prevention, mitigation, and response strategies:</p> <ul style="list-style-type: none"> <li>• WAPA staff are receiving training on the use of new technologies and tools experts from other WAPA regions, training materials, demonstrations, and on-the-job training through pilot projects.</li> <li>• Vegetation management crews maintain International Society of Arboriculture Utility Arborist certifications through extensive field and virtual learning events.</li> <li>• WAPA Vegetation Management staff are participating members in the North American Transmission Forum which allow members from other utilities to share best management practices.</li> <li>• WAPA Utility Arborists are required to complete hazard tree identification training.</li> </ul> <p><b>2021 Approach:</b> In 2021, WAPA staff will continue to receive the aforementioned training and training related to the use of LiDAR, UAVs, and wildfire mitigation tools and technologies through local resources, seminars, and on-the-job training.</p>				

Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022				
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
<p><b>2021 Progress:</b> WAPA Vegetation Management staff completed training for the updated line inspection software, LiDAR, Wildfire Risk Mitigation Business Case Development; Vegetation Program Management; Worker Safety – Escape Routes, Lone Worker, First Aid.</p> <ul style="list-style-type: none"> <li>• <b>2022 Approach:</b> WAPA staff will continue to receive the aforementioned training and additional training related to the use of LiDAR, UAVs, and wildfire mitigation tools and technologies through local resources, seminars, and on-the-job training.</li> </ul>				
<p><b>HFTD:</b> High Fire Threat District Tier areas 2, 3 or All (1-3)</p> <p><b>ROW:</b> Right of Way or Off-Right of Way or Both</p>				

### C. TANC's Established Wildfire Prevention, Mitigation, and Response Strategies

The Project has been operated and maintained since energization in 1993 to maintain safety, reliability, resiliency and, among other things, to address three key considerations:

1. The potential for an outage of the COTP;
2. The potential for an ignition that could cause a wildfire; and
3. The need to rapidly and effectively respond to such an ignition to limit its spread and consequent damages to the transmission line, its ROW, and other potentially affected lives, property, and resources.

TANC's current, established operations and maintenance, vegetation and fuels management, and access road maintenance programs have been developed and refined in response to these three considerations. These activities form a strong foundation for maintaining Project reliability and reducing wildfire risks. They are complemented by ongoing fire response, fuels management, and access road activities funded through agreements with the USFS.

#### 1. Operations and Maintenance Inspections and Activities

##### *a. Tower and Equipment Inspections*

COTP tower and equipment maintenance inspections have been developed to maintain or improve upon the design criteria used for the Project. Development of the design criteria for the COTP was based on the requirements of California GO 95 and the National Electrical Safety Code. Project design and construction relied on available weather and climatic data to calculate the climatic extremes and variabilities that would need to be withstood for the Project to operate properly. The key weather and climatic variables included ice build-up, wind speeds and temperature. Among a complex set of engineering considerations, conductor stringing also needed to comply with minimal horizontal and lateral clearance distances from the ground surface, certain crossings, and structures located near the ROW. COTP substation and communication site inspections focus on reliability and preventative maintenance.

On behalf of and under delegated contract to TANC, WAPA conducts the following aerial and ground transmission line structure and equipment inspections:

- Semi-annual aerial line patrols with intermediate patrols as needed. Patrol crews look for encroachments, new developments that may interfere with maintenance activities, and tower, conductor and hardware conditions.
- An aerial LiDAR patrol is performed typically every five years, with specific frequency being informed by a number of factors, including field conditions and regulatory requirements. LiDAR provides clearances between equipment and information on other items such as trees and structures.
- Maintenance crews conduct annual ground line patrols; scheduled year-round. Conditions are noted and scheduled for repair.
- Twenty (20) percent of all tower structures are subject to an annual detailed ground inspection. On a scheduled basis, every 5<sup>th</sup> tower is thoroughly inspected annually by the line crew resulting in every COTP tower being ground-detailed-inspected every five years. A close visual inspection of the tower is conducted. Crews look for any loose steel, bolts on the ground or any other aberrant condition. Towers are climbed as necessary to identify and schedule repairs.
- As a good utility practice, ground patrols are deployed to investigate line outages.

***b. Substations Inspections***

Inspection activities associated with substation maintenance at Olinda Substation, Maxwell Compensation Station, and Tracy Substation expansion include:

- Perform monthly substation inspections at Olinda, Tracy, and Maxwell.
- Perform annual infrared survey of substation equipment.
- Security activities include facility inspections and site assessments at the Olinda, Maxwell, and Tracy stations in accordance Critical Infrastructure Protection requirements.

***c. Communication Sites Inspections***

Communication site maintenance inspections include, but are not limited to:

- Performing semi-annual site inspections.
- Inspecting, adjusting, cleaning, and repairing communication equipment, batteries and chargers, antenna towers and wave guides, and auxiliary power supplies, as needed.
- Repeater site inspection, adjustment, and cleaning, and repair of station service-related equipment, including the building, batteries and charger, heaters and air conditioners, antenna towers and waveguides, and

auxiliary power supplies, as needed including weed control, fence and gate, etc.

## 2. Vegetation, Fuels Management, and Access Road Maintenance Inspections and Activities

### *a. ROW Vegetation Management Inspections*

TANC uses inspection and recordkeeping tools that integrate existing geographic information system (GIS) and computer maintenance management system databases in support of the following inspections.

- Line vegetation management inspections are conducted annually with no more than 18 calendar months between inspections.
- Aerial patrols are typically flown quarterly and can be scheduled to capture changes in ground conditions, a full season of vegetative growth and flight visibility.
- Ground patrols are conducted annually and can be scheduled to consider access restrictions, fuel hazards and winter conditions.
- Inspections may also be conducted more frequently if site conditions such as vegetation growth warrant it to prevent an encroachment.
- Utility arborists and registered professional foresters monitor COTP ROW conditions year-round.

### *b. Vegetation Management Within the COTP ROW*

TANC has a well-established integrated vegetation management program for managing vegetation within the COTP ROW that relies upon annual identification of danger trees and hazard trees<sup>7</sup> that could either grow or fall into COTP conductors, and potentially hazardous fuels accumulations. Identified trees are either removed or trimmed on a prioritized basis to Minimum Vegetative Clearance Distances consistent with the most current version of NERC Standard FAC-003-4 for Transmission Vegetation Management. Fuels are maintained to a low-growing status.

Routine assessments are used to evaluate site conditions and determine the extent of work needed, treatment method, priority, schedule and re-treatment interval. Some of the factors that may influence prescriptive treatment decisions are:

- Safety;
- Line voltage (which determines conductor clearances);
- Treatment objective;
- Type and density of vegetation - target and non-target species;
- Expected growth rates;

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<sup>7</sup> Hazard trees and danger trees are defined in American National Standards Institute (ANSI) standards (ANSI 300 Part 7). A danger tree is any tree on or off the right of way that could contact electric supply lines. A hazard tree is a structurally unsound tree that could strike electric supply lines when it fails.

- Size of treatment area;
- Anticipated costs and equipment limitations;
- Effectiveness of possible treatments;
- Landowner or land managing agency;
- Contractual rights;
- Accessibility;
- Climate/meteorological conditions at time of treatment;
- Herbicide use regulations;
- Site conditions – soils, slope, and drainage; and
- Presence of sensitive species and/or sensitive cultural resources.

Based on these assessments, all of the vegetation management work planned for the year is inventoried for:

- The location of work;
- Landowner restrictions;
- Clearance distances; and
- Current work status.

All vegetation work is tracked in databases supporting maintenance and vegetation management work activities. The work is only considered complete when verified on the ground. All contractors are required to follow strict fire safety precautions that include work site fire requirements, water supply for firefighting, engines equipped with spark arrestors, and supporting communications, equipment, and fire prevention and mitigation related instructions. Contractors also follow all appropriate fire restrictions on USFS lands, and fully comply with USFS fire plans for construction and service contracts.

The process of communicating an imminent vegetation-related threat is based on established guidelines. Those guidelines require the reporting of all electrical events, including imminent threats, to the WAPA Transmission Switching and Operations Dispatcher (Dispatcher). The Dispatcher has the authority to direct field personnel and contracted crews during emergencies. Any situation identified as an imminent threat is mitigated as soon as possible, regardless of land ownership, access, environmental issues, or any other work constraints.

Orchard trees grow rapidly and represent potential vegetation-to-conductor risks that could ignite a wildfire. The orchard removal and land rights acquisition program is focused on removing existing orchards growing within the COTP ROW and preventing vegetation that could grow within required Minimum Vegetation Clearance Distances from conductors. This program compensates orchard owners for foregone crop revenues in exchange for the removal of existing orchards and placing future limitations of the rights of landowners to grow crops above a 12-foot height limit. Other rights that further reduce wildfire and related liability risks are also incorporated into the upgraded easement rights.

*c. Vegetation Management Outside the ROW*

TANC also inspects and manages for danger and hazard trees located outside of the COTP ROW. Trees are identified for removal by utility arborists and/or registered professional foresters. Rights of entry and the terms and conditions associated with the cutting and removal and/or disposition of danger and hazard trees is agreed upon with the potentially

affected landowners. This program is scheduled as needed based on the proximity of trees to the edges of the ROW, growth rates, and utility arborist field observations.

*d. COTP Access Road Inspections and Maintenance*

The COTP Access Road Maintenance Program is an ongoing program that identifies access roads requiring erosion and drainage control and other improvements to ensure that maintenance crews always have access to the COTP ROW. Access road maintenance activities are conducted on a routine or emergency/as needed basis to ensure that heavy equipment and wider and heavier-track transport vehicles also have access as needed for maintenance and repair of the COTP towers and conductors. This level of access also maintains and improves fire response capabilities for fire engines and crews that may be needed to respond to wildfires.

*e. Communication Site Defensible Space Activities*

COTP communication sites located in forested areas may be surrounded by thick tree and shrub growth. This growth represents a risk to wildfire response activities and may prevent adequate wildfire defense resources from accessing the site. These activities are directed towards the development of adequate defensible space surrounding forested communications sites. TANC is working with the underlying landowners and other tenants at these sites to implement forest thinning, fuels management, access road maintenance, and other best practices to achieve long-term site defensible space.

*f. TANC-USFS Collaborative Fuels Treatments*

The COTP ROW crosses 58 miles of National Forest System lands that include the Lassen, Modoc, and Shasta-Trinity National Forests. TANC and the USFS jointly collaborate on fuels treatment and shared access road maintenance work in an area of northeastern California where the COI lines are parallel and in close proximity. The COI is a corridor of three roughly parallel 500 kV alternating current power lines connecting the electric grids of Oregon and California. Their combined power transmission capacity is 4,800 megawatts (MW). The goal of these joint activities is to maintain electric transmission system reliability by: 1) Sufficiently reducing the fuel loads between the lines to eliminate the potential for a forest fire-caused simultaneous outage of all three 500 kV transmission lines; and 2) Ensuring prompt and correct action in the event an accidental fire should occur. These objectives are met through the use of management practices designed to create low fuel hazard conditions between the COTP and the other COI lines.

*g. TANC-USFS Collaborative Access Road Maintenance and Improvement*

TANC and the USFS annually develop a list of priorities for shared road maintenance activities based on the need to reduce the wildfire risks to the COTP and other COI lines, including improved access and staging. These activities are implemented near the COTP or other COI rights of way where fire response to the transmission infrastructure is important.

1. Wildfire Response Capabilities

*a. TANC-Funded Fire Station*

TANC annually provides funds for a fire station (Long Bell Fire Station), engine, and firefighters in the Modoc National Forest near the northeastern California area where the COI lines run near one another. The Long Bell Fire Station includes a garage for housing fire engines, an office and barracks. The fire engine is typically staffed with five wildland firefighters. Standard Operating Procedure for the Modoc National Forest requires that an engine be assigned to Long Bell or “on order” throughout the fire season, generally May through late November. This ensures a rapid response to fires occurring near the COI lines. The Long Bell Fire Station is staffed throughout the fire season with USFS personnel.

**VI. Wildfire-Related Communications Protocols Regarding COTP Deenergization, Recloser Disabling and Service Restoration**

**A. Introduction**

This section discusses TANC communications protocols regarding COTP deenergization, recloser disabling and service. These protocols have been developed for two scenarios that include:

- 1) the threat of an imminent wildfire that may be advancing on the COTP ROW; or
- 2) high fire threat weather conditions (e.g. sustained high-speed winds, high temperatures, low humidity, etc.) that may necessitate COTP deenergization. Protocols for disabling reclosers are summarized first, followed by protocols for deenergizing BES elements. The COTP is a BES element. This section also includes a discussion of the public safety communications responsibilities as they relate to a potential COTP deenergization.

**B. Protocols for Disabling Reclosers Under Imminent Fire and/or Smoke Threat Conditions**

1. Recloser Disabling

- Upon notification of an imminent fire and/or smoke threat to an element of the BES - including the COTP, COTP reclosers will be turned off for safety of personnel and the possibility of fire ignition.



## 2. Enabling Reclosers After Threat De-escalation

- Upon the de-escalation of fire and/or smoke threat activity, reclosers will be restored to their original states.

### **C. Protocols for Disabling Reclosers Pre-emptively Based on High Fire Threat Weather Activity**

#### 1. Recloser Disabling

The decision to preemptively disable reclosers prior to a high fire threat weather event requires consideration of many complexities both known and unknown. Disabling reclosers is therefore ultimately based on the following considerations:

- Red Flag Warnings issued by the National Weather Service for fire weather zones containing the COTP in the HFTD;
- Ongoing fire activity throughout the service territory and California in general;
- Assessments of known local conditions, including wind speeds (sustained and gusts), humidity and temperature, fuel moisture and fuel loading; and
- Input from real time observations from vegetation management personnel or field craftsman as appropriate.

#### 2. Enabling Reclosers After Pre-emptive Disabling

Upon de-escalation of high fire threat weather activity, reclosers will be returned to their normal states for affected BES elements.

### **D. Protocols for Deenergization Under Imminent Fire and/or Smoke Threat Conditions**

#### 1. Deenergization

Upon an immediate fire and/or smoke threat to the COTP, deenergization will occur following sound utility practice.

#### 2. Service Restoration or Reenergization

Upon de-escalation of fire and/or smoke activity and when safe to energize the COTP will be returned to service.

### **E. Protocols for Pre-emptive De-energization Based on High Fire Threat Weather Activity**

#### 1. Deenergization

The decision to pre-emptively deenergize BES element(s) prior to a high fire threat weather activity and events requires consideration of many complexities both known and unknown. Deenergization is therefore ultimately based on the following considerations:

- Red Flag Warnings issued by the National Weather Service for fire weather zones containing the COTP in the HFTD;

- Assessments of known local conditions, including wind speeds (sustained and gusts), humidity and temperature, fuel moisture and fuel loading;
- Real-time situational awareness information from personnel positioned in high fire threat areas identified as potentially at risk, areas located near circuits identified for inclusion on the circuit monitoring list, and in other areas identified during the incident as at risk of being subject to extreme weather conditions;
- On-going fire activity throughout the service territory and California in general;
- Input from real time observations from vegetation management personnel or field craftsman as appropriate;
- Potential impacts to customers and communities;
- Input from local and state fire authorities with specific concerns regarding the potential consequences of wildfires in select locations;
- Real-time system studies and expected impact of de-energizing circuits on the BES and essential services;
- Awareness of mandatory or voluntary evacuation orders in place; and
- Ongoing notifications to local agencies and officials.

## 2. Service Restoration or Reenergization

Upon de-escalation of high fire threat weather activity, the COTP will be returned to service following sound utility practices.

## **F. Public Safety Communications Responsibilities**

TANC does not have an electric service territory or serve end-use electric customers. TANC provides wholesale transmission service to its member electric utilities and other companies that purchase transmission capacity on the COTP. During a public safety power shutoff, as a result of a de-energization of the COTP, TANC will use existing and well-established operating and communications procedures to notify entities that are utilizing the COTP. The existing operating procedures provide a framework for communicating with entities that are directly utilizing the COTP, so that those entities can make the necessary accommodations to minimize the impact to any end-use electric customers that may be affected due the public safety power shutoff. In many instances, a public safety power shutoff or deenergization of the COTP may not result in any service interruption to end-use electric customers. However, to the extent that end-use electric customers may be adversely impacted due to a public safety power shutoff of the COTP, the entities utilizing the COTP that have end-use electric customers are responsible for notifying their respective customers of potential electric service interruption and restoration activities.

## VII. Plan Evaluation and Metrics

### A. Introduction

This section presents the annual process TANC will use to evaluate the effectiveness of this Plan, including descriptions of:

- The metrics that will be used to measure the effectiveness of wildfire prevention, mitigation, and response strategies in reducing wildfire ignition and spread risks and their contributing risk drivers;
- Activities to monitor the effectiveness of COTP structure and equipment inspections;
- The process that will be used to monitor and audit the implementation of the Plan;
- Methods for identifying and correcting any Plan deficiencies; and
- A discussion of how the application of previously identified metrics has informed this Plan.

This section also reviews the process that TANC used to contract for the services of an Independent Evaluator, to receive public comments, and to otherwise comply with related SB 901 requirements.

### B. Metrics for Evaluating Plan Performance

TANC uses metrics that are results oriented and focused on the success of wildfire prevention, mitigation, and response strategies at reducing the risk of catastrophic wildfires. Metrics are quantitative or qualitative for strategies scheduled annually for implementation. Annual progress will be monitored and reported to the appropriate TANC and/or COTP committees for those strategies to be evaluated and considered from 2020 through 2022.

Table VII-1 summarizes the metrics that will be used to measure outcomes for this Plan within the context of its risk assessment framework. It includes the wildfire risk event and drivers, the corresponding annual metrics to be used, and how the metrics are intended to focus on outcomes that directly reduce wildfire risk events and/or drivers.

It indicates how some metrics will provide insights regarding the effectiveness of maintenance and vegetation management inspections. It also provides insights and trends where additional situational awareness may be needed with respect to local meteorological conditions, security, or other mitigation or response strategies, and addresses continuous fire safety training as needed.

Table VII-1. Metrics for Evaluating the TANC-COTP Wildfire Mitigation Plan		
Wildfire Risk Event & Drivers	Annual Metric	Outcomes/Effectiveness
Wildfires <sup>1</sup>	Number of COTP-ignited wildfires and cause(s).	Provides an overall indicator of Plan effectiveness.
Equipment Failure		
Downed Wire	Number of downed wires.	Provides insights regarding

Table VII-1. Metrics for Evaluating the TANC-COTP Wildfire Mitigation Plan		
Wildfire Risk Event & Drivers	Annual Metric	Outcomes/Effectiveness
		maintenance inspections effectiveness.
Wire to Wire Contact	Number of wire-to-wire contacts/faults.	Provides insights regarding conductor and equipment design, quality, and lifecycle expectancy.
Clamps, Conductors, Insulators, Splices, Spacer-Dampers, Towers, Substation, Communication Site, Other unspecified	Number of equipment failures by facility.	Provides insights regarding conductor and equipment design, quality, and lifecycle expectancy.
Weather-driven	Number of weather-driven faults and cause(s).	Identifies trends where additional local real-time weather data may be needed.
<b>Object to Wire Contact</b>		
Vegetation-Caused Outages	Number of vegetation-caused outages and cause.	Provides insights regarding vegetation inspections effectiveness.
Hazard Trees Removed	Number of hazard trees identified and removed.	Reduces the number of potential vegetation to wire contacts; a direct measure of effectiveness.
Fuels Reductions	Acres of fuels treatments completed– within and outside of the COTP ROW.	Reduces the flammability of fuels subject to ignitions from equipment failures, thereby reducing potential wildfire spread rates.
Bird Strikes	Number of bird strike incidents and operational and/or maintenance impact(s).	Increases awareness of where additional bird-repulsion measures may be needed.
<b>High Fire Threat Conditions</b>		
Local Weather & Meteorological Conditions	Date of each high fire threat day, and number of high fire threat days.	Allows daily correlation of weather and meteorological conditions with equipment failures. Allows daily correlation with conductor loading.
<b>Third Party Contact</b>		
Table VII-1. Metrics for Evaluating the TANC-COTP Wildfire Mitigation Plan		
Wildfire Risk Event & Drivers	Annual Metric	Outcomes/Effectiveness
Drone/Light Aircraft, Vandalism	Number of drone, light aircraft, or vandalism, incidents and operational and/or maintenance impact(s).	Increases awareness of where additional security measures may be needed.
1/A fire ignition is defined as follows: <ul style="list-style-type: none"> <li>• A COTP facility was associated with the ignition of a fire;</li> <li>• The fire was self-propagating and of a material other than electrical and/or communication facilities;</li> <li>• The resulting fire travelled greater than 100 feet from the ignition point; and</li> <li>• TANC had knowledge that the fire occurred.</li> </ul>		

## C. Monitoring and Auditing of Plan Implementation

### 1. Plan Monitoring

TANC will monitor the implementation of this Plan using data collected through implementation of the wildfire prevention, mitigation, and response strategies. On behalf of TANC, WAPA

maintains an extensive maintenance database of all COTP operational incidents and asset maintenance inspections and repairs. Operational incident information includes the date and time of the incident, its duration, incident weather conditions, identified cause, impact to the system, and comments pertaining to the incident investigation. Maintenance data includes:

- Information on the last date an inspection was completed and its findings;
- The status of repairs in progress or completed; and
- The next scheduled inspection.

TANC will categorize this information to provide the metrics developed in Table VII-1. TANC will annually track each metric and correlate them with existing information on the type and frequency of maintenance and vegetation inspections. This tracking will provide insights regarding the effectiveness of those inspections, and future guidance on any adjustments to those inspections that may become apparent from the data collected. Other potential causal correlations between high fire threat conditions and/or districts, equipment failures, and other incidents may also be developed.

#### 4. Plan Auditing

TANC will internally audit the effectiveness of Plan implementation using the management organization presented in Section III. Metrics data will be compiled and evaluated annually. The risk assessment framework, wildfire prevention, mitigation, and response strategies (Wildfire Strategies), and metrics themselves will be analyzed with respect to providing needed information. These annual compilation and evaluation activities are captured in the format and content of Tables V-1 and V-2 presented in Section V of this Plan. The annual updating of each Wildfire Strategy with a chronological accounting of the progress achieved and the subsequent years' approach provide an ongoing and cumulative record of the lessons learned regarding each Wildfire Strategy's development and implementation. This record in turn supports a fully informed auditing of the Plan's effectiveness.

Under the supervision of the TANC General Manager and Assistant General Manager, the COTP E&O and Management Committees will then consider the data and review the effectiveness of the entire Plan. Based on this review, the Plan will be adjusted to increase its effectiveness. These adjustments may include, but not be limited to changes in the Wildfire Strategies and each section of this Plan, as appropriate. Plan adjustments will be considered by the TANC Commission and reflected in subsequent versions of the Plan. It will also include any adjustments that are needed to identify and correct Plan deficiencies.

#### 5. How Previously Identified Metrics Have Informed this Plan

TANC's established wildfire risk reduction programs and activities described in Section V have informed the development of several Plan metrics. COTP equipment inspections use a complex set of risk-related metrics that allow repairs to be prioritized according to potential probabilities of failure and associated consequences. Transmission vegetation management metrics required for compliance with NERC Standard FAC-003-4 have informed metrics that will be used in this Plan to focus on reducing vegetation-to-wire contact hazard tree risks in HFTDs. Metrics associated with the acres of fuels treated by the USFS near the COI lines in northeastern California

have and will continue to inform the timing and location of fuels treatments designed to reduce wildfire ignition and spread rates, and metrics used in this Plan.

#### 6. Plan Evolution

This Plan is a living document that will evolve annually. As new technologies that improve the effectiveness of COTP inspections, repairs, situational awareness, and other wildfire strategies become available and feasible, TANC intends to improve its wildfire risk prevention capabilities and thereby reduce potential wildfire risks and the potential for corresponding enterprise-wide consequences.

#### **D. Public Review**

TANC will annually present this Plan in an appropriately noticed public meeting and accept comments on this Plan from the public, other local and state agencies, and interested parties. TANC will annually verify that this Plan complies with all applicable rules, regulations, and standards, as appropriate.

#### **E. Independent Evaluation**

TANC contracted for an independent evaluation (IE) of the 2020 version of this Plan. The independent evaluator:

- Had experience in assessing the safe operation of electrical infrastructure;
- Was required to review and assess the comprehensiveness of this Plan;
- Issued a report that was made available on the TANC Internet Web site; and
- Presented the report at a duly noticed 2019 TANC Commission meeting.

TANC will annually consider the need for an Independent Evaluation.